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ABSTRACT

A study investigated the effect of kindergarten class size on reading readiness achievement. Subjects, 2,837 kindergarten students in 38 elementary schools that serve rural, urban, suburban, and inner-city schools, participated in the first year of Project STAR (Student Teacher Academic Ratio) in 1985-86. The subjects' 140 kindergarten teachers reported data indicating mastery or non-mastery of the 25 reading readiness objectives of the Tennessee Basic Skills First program. Data were analyzed using a five-way analysis of variance and a crosstabulation procedure with a chi-square test of significance. Results indicated that: (1) small class size is significantly related to reading achievement in the total 25 tested Basic Skills and the subcategory of 20 comprehension skills; (2) the 1:15 class mastered one more objective than the 1:25 class and 0.6 more of an objective than the 1:25 plus a full-time aide class; (3) no significant relationship was found between classes of 1:15, 1:25, or 1:25 plus a full-time aide and the mastery of the five word identification skills; (4) the 1:25 class was found to be least effective in achieving reading readiness; (5) students in classes of 1:15 who attended 90 percent of the time showed the greatest gain; and (6) the lowest mean scores were received by males, blacks, free/reduced lunch, and inner city students in the 1:25 class, and the highest scores for this group were in the 1:15 class. Recommendations include mandatory kindergarten with a teacher/pupil ration of 1:15. (Twenty-three tables and 58 figures of data are included; 95 references, House Bill No. 544, the Tested Basic Skills Individual and Group Records, and 25 tables of data are attached.) (RS)

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THE EFFECT OF CLASS SIZES OF 1:15, 1:25, AND 1:25 PLUS FULL-TIME AIDE ON KINDERGARTEN READING READINESS ACHIEVEMENT

A Dissertation

Submitted to the Graduate School

of

Tennessee State University

in

Partial Fulfillment of the Requirements

for the Degree of

Doctor of Education

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ABSTRACT

ROSEANNE K. JACOBS. The Effects of Class Sizes of 1:15, 1:25, 1:25 Plus a Full-Time Aide on Kindergarten Reading Readiness Achievement (under the direction of DR. PAUL MADDEN and DR. HELEN BAIN.)

One hundred and forty teachers participating in the first year of Project STAR (Student Teacher Academic Ratio) in 1985-86 submitted for 2,837 kindergarten students data indicating mastery or non-mastery of the 25 reading readiness objectives of the Tennessee Basic Skills First program. Project STAR is a four-year $12 million dollar longitudinal study of class size funded by the Tennessee General Assembly.

Data were analyzed using a five-way analysis of variance and a crosstabulation procedure with a chi-square test of significance. A statistically significant relationship was found between small class size and reading readiness achievement in the total 25 tested Basic Skills and the subcategory of the 20 comprehension skills at the .01 level of significance. The 1:15 class mastered one more objective than the 1:25 class and .6 more of an objective than the 1:25 plus a full-time aide class. No significant relationship was found between classes of 1:15, 1:25, or 1:25 plus a full-time aide and the mastery of the 5 word identification skills. The 1:25 class was found to be least effective in achieving reading readiness. Students achieve better in all three

types of classes when they are present over 90 percent of the time. Students in classes of 1:15 who attended 90 percent of the time showed the greatest gain. A statistically significant relationship was found between sex, race, socio-economic status, geographic localities, and achievement in the three reading readiness areas analyzed. Within each variable category, the lowest mean scores in the 25 total Basic Skills and the 20 comprehension skills were for males, blacks, free/reduced lunch, and inner city students in the 1:25 class, and the highest scores for this group were in the 1:15 class. It would seem from this study that it would be most cost effective if this group were in a 1:15 class.

The recommendations included:

1. Kindergarten should be mandatory.
2. Pupil/teacher ratio should be 1:15 for kindergarten students.
3. Teachers should be trained to:
   a. Utilize small group instruction
   b. Utilize home visits and parent training to reinforce readiness skills.

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CHAPTER I

INTRODUCTION

The issue of class size is not new. Since before the 1900s and specifically in the last sixty years, class size has become one of the most researched, controversial, and inconclusive topics in education. One needs only to listen to legislators as they state their philosophical opinions on education to recognize the importance of the class size debate. Research abounds with studies of the relationship of class size to achievement. For every research study correlating a positive relationship of small class size to achievement increases, a similar study can be produced which indicates there is no significant relationship or that students can learn as well in a large class environment.

Criticism abounds on class size research projects and studies. A 1915 study on class size conducted by Charles Harlan presented evidence that the size of the class was not an "important factor in school efficiency." Criticisms were published in regard to Harlan's findings. Harlan's rebuttal of the criticism of the study leads to the determination that even in early research studies on class size agreement was less than forthcoming.[1] The much publicized and debated

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[1] Charles Harlan, "Discussions and Communications," Educational Administration and Supervision 1 (1915): 465-68.

reviews of class size studies in the 1980s by Glass and Smith and studies by the Educational Research Service have continued to keep the discussion of class size on the forefront of educational topics.[2]

In the midst of conflicting data is the educational practitioner, the classroom teacher, who unequivocally supports the benefits of small class size on instruction, achievement, student self-concept, classroom management, discipline, and student and teacher morale. In a study on teacher effectiveness and satisfaction, eighty-five teachers in the San Francisco Bay area indicated their major concerns were problems relating to "class size and the increased academic and emotional needs of students." Teachers felt that by reducing class size they could better meet the wide range of individual needs of students.[3] Teacher delegations through teacher organizations have insisted for years that smaller classes are essential to the academic progress of students. Feelings and sentiments run strong on the issue. Class size has been a topic of negotiations and has resulted in teacher strikes throughout the years when satisfactory

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[2] Educational Research Service, "Class Size Research: A Critique of Recent Meta-Analyses," Phi Delta Kappan 62 (1980): 239-41.

[3] Milbrey McLaughlin, "Why Teachers Won't Teach," Phi Delta Kappan 67, no. 6 (1986): 422, 426.

agreements could not be reached on maximum class size limits. The classroom teacher, however, does not need educational researchers or teacher organizations to enumerate the benefits of small class size. To a classroom teacher, small class size might mean six or seven students instead of nine or ten in three reading groups, two or three math groups instead of four or five groups, fewer bodies interacting to create discipline problems, more time to spend with individual students and their needs, less lunch money to collect, fewer papers to grade, more individual or small group curriculum activities or instructional strategies directed to the various learning modalities, and less teacher fatigue and exhaustion at the end of the school day.

To a student in a smaller class, it might mean the opportunity for more personal interaction with the teacher and other students. These interactions may help to develop in students a more positive self-concept and to strengthen their ability to work in cooperation with their classmates and society in the future. Also, today's student may possibly be an only child, or in most cases have not more than one sibling with whom to relate, thus, making the transition to a classroom of twenty-five students more difficult than it would be to interact with fewer students.

Bozzomo suggests that parents who have a choice prefer to have their children in a class of twenty-five rather than thirty. He states:

> Those who have the choice invariably select the smaller class. I do not know of one private (not parochial) school any where, regardless of affiliation, geographic location, goals or objectives, that does not advertise that it offers smaller classes than do the public schools. People who send their children to private schools often do so because the student-teacher ratio is low enough to provide individualized human attention and personal treatment for their children.[4]

Furthermore, due to changing family structures, pressures of society, and economic demands on parents, there is less time within a family to deal with the psychological and emotional needs of the child. It has thus become the responsibility of education to deal with not only the academic, but also the emotional, psychological, and physical well-being of the students.

Increasingly, the general public has become less involved in the public schools. Population changes, such as increases in the senior citizen population and greater numbers of childless couples, have created less fiscal support for education. To further complicate the issue, school administrators must weigh the benefits of small class size in relation to the number of dollars which are appropriated within school budgets. Although always a consideration, the issue of class size is usually eliminated when funds are limited. The question is always asked, can the increased

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[4] Lawrence Bozzomo, "Does Class Size Matter?" National Elementary Principal 57 (1978): 81.

dollar amounts for more classroom space, more teachers, and more materials necessary for small classes be justified?

Historically, one of the unanswered questions in the field of class size research deals with the "optimum class size." By as early as 1891, the debate was initiated and is presently unresolved. Otto reports that a Wisconsin superintendent in 1891 proposed a maximum of ten pupils for first grade, twelve for second, and twenty in each grade above second, and that in 1885, J. D. Philbrick suggested a "fair number" of students was fifty-six. In 1891, when the United States Office of Education began to publish pupil-teacher ratios, the combined elementary secondary ratios were 35.1:1.[5]

During the 1930s classes were larger than at any preceding time. Many factors such as:

> declining birth rate, decreased immigration, smaller number of school age children, the financial status of the community, lack of employment opportunities in time of depression, population shifts, and induction of pupils into the armed forces in time of war affected class size.[6]

By 1974, pupil-teacher ratios varied across the United States from 26.8 in Utah to 17.9 in Vermont.[7]

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[5] Henry J. Otto, Class Size Factors in Elementary Schools (Austin: The University of Texas, 1954), pp. 2-3.

[6] Harry N. Rivlin, Encyclopedia of Modern Education, 1943 ed.

[7] Herbert J. Walberg and Sue Pinzer Rasher, "Public School Effectiveness and Equality: New Evidence and Its Implications," Phi Delta Kappan 56, no. 1 (1974): 7.

In recent years, the class size debate and investigation have undertaken a new avenue for discussion. Interest in the last two decades has begun to focus not only on the need for smaller class size but also on the effect that smaller class size might have on primary grade children and the curriculum subjects within the lower grades. Also in recent years when education has taken a seat of importance in every political campaign, and when politicians have promised to provide better schools if elected, education has been brought in focus, and every voting citizen has been asked to examine ways to produce more effective schools. Class size is always mentioned as one of the possibilities. At the same time, the importance of lower class size in the primary grades has gained recognition. This point can be documented by state projects such as South Carolina's First Grade Pilot Project and Indiana's Prime Time Project. The focus of both studies was the effects of lower class size in the primary grades. Since both studies encompassed two years, important information and data were collected. To further emphasize the importance the class size issue has gained, as a result of the Indiana study, the 1984 Indiana General Assembly appropriated nineteen million dollars for a reduction in first grade class size to an 18 to 1 ratio.[8]

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[8] Vana H. Meredith and others, South Carolina First Grade Pilot Project 1975-76: The Effects of Class Size on Reading

Since 1984, the state of Tennessee has been in the forefront of educational reform across the nation. Tennessee's Comprehensive Education Reform Act (CERA) has created much discussion, national attention and controversy inside and outside of educational circles. CERA was designed to address and to improve many phases of education in Tennessee. Millions of dollars were appropriated by the legislature to fund the massive programs.

In May of 1985, as part of the Better Schools Program, the Tennessee legislature approved House Bill 544 (see Appendix A). The intention of the legislation was to study the effects of reduced teacher-pupil ratio on the achievement of students in the public schools. Three million dollars annually for four years ($12 million total) was appropriated for the study. Project STAR (Student-Teacher Academic Ratio) is a four-year longitudinal st dy and will follow most of the same children from kindergarten through the third grade. Stipulated within the legislation was the requirement for

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and Mathematics Achievement (Bethesda, MD: ERIC Document Reproduction Service, ED 135 072, 1977); Lynne M. Johnson, Roan A. Garcia-Quintana, South Carolina First Grade Pilot Project 1976-77: The Effects of Class Size on Reading and Mathematics Achievement (Bethesda, MD: ERIC Document Reproduction Service, ED 151 087, 1978); Edith Helmich and Leighton Wasen, Class Sizes for Kindergarten and Primary Grades: A Review of the Research, Indiana State Board of Education, Springfield, Department of Planning, Research and Evaluation (Bethesda, MD: ED 260 827, 1985).

demonstration centers to be located within the three grand divisions of Tennessee in inner-city schools, urban schools, suburban schools, and rural schools. Every experimental class within the project is to have a maximum of seventeen students and a minimum of thirteen.

During the summer of 1985, a consortium of higher education personnel representing four universities, The University of Tennessee, Tennessee State University, Memphis State University, and Vanderbilt University, were asked to develop a research design for the project.[9] The decision was made to use an in-school design. Implementation of the design was to be administered by the Tennessee State Department of Education.[10]

School systems and schools across the state volunteered to participate in Project STAR. Approximately 180 individual schools applied. Forty individual school applications were received from Memphis City alone. Because the first year of the study (1985-86) was to be implemented in kindergarten, the individual schools were required to have a minimum enrollment of fifty-seven kindergarten students.

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[9] The representatives were Dr. Churck Achilles, University of Tennessee; Dr. Helen Bain, Tennessee State University; Dr. Fred Bellot, Memphis State University; and Dr. John Folger, Vanderbilt University.

[10] Elizabeth Word was to be the director of the project for the Tennessee State Department of Education.

Several volunteer schools had to be excluded because of less than fifty-seven kindergarten students enrolled. In 1985-86, approximately 6,500 students participated in Project STAR.

A new day is dawning in class-size research. The classroom teacher has been convinced for decades of the advantages of small class size. The researcher after enumerable studies has only clouded the issue without being able to provide conclusive evidence of the advantages and disadvantages of the size of classes on children in our schools. The public, although verbalizing the benefits of smaller classes, has not always been willing to fund programs to achieve lower pupil-teacher ratios. Tennessee's four-year STAR Project can provide additional answers and increase the data on the class-size question. It will hopefully be the first step toward solving the question, "Does class size really make a difference?"

Statement of the Problem

The problem facing educators in Tennessee is to determine the most effective class size for kindergarten students. There is not adequate research data on which the general assembly or school boards can make allocation of funds. This study of kindergarten reading readiness achievement will provide the Tennessee General Assembly, the Tennessee State Department of Education, and the educational research community with an analysis of data which will aid

in determining the appropriate kindergarten class size as it relates to achievement in reading readiness.

Significance of the Problem

Today more than ever before public school classrooms are composed of a more diverse student population with varied academic, emotional, and social needs. Society is mandating that the public schools assume a greater role beyond the academic education of the school age population. States are mandating more rigorous standards, and more complex curriculum objectives are introduced to students at earlier ages. Demands are placed on teachers to excel in instructional strategies, produce higher achievement test scores, and create within the classroom an harmonious environment which will propagate the next generation of workers for the nation. On the horizon looms population shifts and growth within areas, and the prediction of shortages of qualified teachers within the next decade.

There is a need within the educational community to identify the effect class size has on these variables and to substantially document the benefits that lowering pupil-teacher ratios will have on public schooling. More specifically, there is a need to examine the effect of smaller class size in the primary grades where the basis for all other learning is developed.

Purpose of the Study

The primary purpose of this study was to determine the degree of relationship between reading readiness achievement scores as measured by the Tennessee Basic Skills First kindergarten objectives and kindergarten class sizes with ratios of 1:15, 1:25, and 1:25 plus a full-time aide as controlled by legislation mandated by the Tennessee General Assembly and under the direction of the Tennessee State Department of Education. The secondary purpose was to correlate the effect of kindergarten class size with reading achievement as it relates to sex, race, socioeconomic status (SES), geographic localities, and attendance of students.

Limitations of the Study

The study was limited to school systems and individual schools throughout the State of Tennessee that submitted applications to participate in a four-year longitudinal study of class size (Project STAR). The study was limited to every school that applied that contained fifty-seven kindergarten students except those which applied from the Memphis City Schools. Forty individual school applications were received from Memphis. Twenty of the forty schools from the Memphis area were randomly selected for participation in the project. The study was further limited to teachers already assigned to the school. Their names were sent to the Tennessee State Department of Education. These

teachers were randomly assigned by the Project Star director to the class sizes. The study was further limited to those teachers within the project who returned both Basic Skills First Reading and Math Information at the end of the school year 1985-86. The study was thus limited to 142 kindergarten classes in 38 schools in 26 systems in the State of Tennessee for the school year 1985-86. When comparison analysis was completed on the frequency distributions for the number of cases reported for the independent variables, the number of students for which race, sex, geographic localities, and SES were reported was 2,426, in comparison with 2,837 students in the total sample. Similarly, there were also 2,426 student cases reported for attendance.

Hypothesis

The hypothesis in this study concerned the effects of reduction in class size to 1:15. The .05 level of significance was used to either reject or fail to reject the following hypothesis. The .01 level was used when applicable.

Hypothesis: There will be no difference in the outcome measures across various conditions of the study.

The conditions (independent or categorical variables) were the following:

1. Class types
    a. Small (1 to 15)
    b. Regular (1 to 25)

c. Regular (1 to 25 plus a full-time aide)

2. SES (Socioeconomic Status)

a. Free or reduced lunch

b. Non-free lunch

3. Sex

a. Female

b. Male

4. Race

a. White

b. Black

c. Other

5. Geographic localities

a. Inner city

b. Urban

c. Suburban

d. Rural

6. Attendance

The issues (dependent or measurable variables) were as follows:

1. Composite of the twenty-five Basic Skills First Kindergarten Reading Readiness Objectives;

2. Composite of the C[illegible]ension Strand of the Basic Skills First Kindergarten Reading Readiness Objectives;

3. Composite of the Word Identification Strand of the Basic Skills First Kindergarten Reading Readiness Objectives;

4. Twenty-five Basic Skills First Kindergarten Reading Readiness Objectives.

Definition of Terms

Attendance percent rate as used in this study is the percentage of the required days that the student was present.

Class size is the number of students assigned to and enrolled in a specific class under the direction of a specific teacher.[11]

The control group is the group in a research study that either receives a different treatment than the experimental group or is treated as usual.[12]

The experimental group is the group in a research study that typically receives a new, or novel treatment, which is under investigation. In this study, the experimental groups are the 1:15 and 1;25 plus a full-time aide.[13]

Group records are a multiple-page group record designed by the Tennessee State Department of Education to be used for each reading group. There is a group record for each grade level, kindergarten through eighth grade. See Appendix B.

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[11] Lee D. Deighton, ed., The Encyclopedia of Education 2(1971): 157.

[12] L. R. Gay, Educational Research (Columbus: Charles E. Merrill, 1981), p. 430.

[13] Ibid., p. 431.

This record lists all the skills by strand for the grade level, both tested and non-tested, across the top of the page. The names of the students in the reading group are listed on the left side of the record. The record is marked by the teacher to indicate the skills that have been introduced, tested, and mastered. The purpose of the group record is to provide a management tool for the teacher. This record gives the teacher a total picture of the materials to be covered and each student's progress. This assists the teacher in making decisions about pacing, skill grouping, and instructional planning.[14]

An individual student record is a single-page individual record for each student. There is a separate individual student record for each level, kindergarten through eighth grade. See Appendix B. The teacher should use the individual student record which matches the student's instructional reading level. This may or may not be the same as the student's grade placement. The purpose of the individual record is to provide information on each student. The individual student record becomes a part of the student's permanent record and should remain in his file.[15]

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[14] Basic Skills First Reading Implementation Guide and Skills Lists (Nashville: Tennessee State Department of Education, 1984), p. 13.

[15] Ibid., p. 14.

The inner city is the largest city, or one of the largest cities, in an SMSA or urbanized area (UA). Most inner cities are named in the title of their SMSA and/or UA. The inner city is, generally, the largest incorporated place in an urbanized area. While a total urbanized area must have at least 50,000 inhabitants, there is no minimum size for inner cities. The smallest in 1980 was under 12,000. Other cities in the UA are generally designated as inner cities if they have a population of 250,000 or more, or for place of 15,000 to 250,000 if they are at least one-third the population of the largest place in the area. However, in the UAs designated prior to the 1980 census, inner city designations have not been changed, even if an additional place achieved eligibility through population growth between 1970 and 1980. In Hawaii and Puerto Rico, where there are no incorporated places recognized by the Bureau of the Census, census designated places are used as inner cities. In the New York-Northeastern New Jersey UA, there are two inner cities not included in the area title: Jersey City, New Jersey, and Newark, New Jersey. Data for inner cities of urbanized areas refer to the urban portion of these cities, thus excluding the rural portions of extended cities. The only inner city schools found in Project STAR were Metro Nashville and Memphis City.[16]

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[16] U.S. Department of Commerce, User's Guide Part B.

The term mastery does not mean absolute mastery. It means appropriate competence at that level after instruction and reinforcement have taken place. Most of the mastery tests have stated an expected level of accuracy to indicate mastery, such as 8/10, meaning eight correct answers out of ten items.[17]

MASTERY as used in this study identifies the composite score of the total of the twenty-five Tennessee Basic Skills tested reading readiness objectives.

READCOMP as used in this study identifies the composite score of the total of the twenty Tennessee Basic Skills tested reading readiness comprehension objectives.

Rural and urban are type-of-area concepts rather than specific areas outlined on maps. As defined by the Census Bureau, the urban population comprises all persons living in urbanized areas (UAs) and in places of 2,500 or more inhabitants outside UAs. The rural population consists of everyone else. Therefore, a rural classification need not imply farm residents or a sparsely settled area, since a small city or town is rural as long as it is outside a UA and has fewer than 2,500 inhabitants. The terms urban and rural are

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Glossary, 1980 Census of Population and Housing [Bruce Chapman, Director], November 1982, p. 9. (Definition supplied by Tennessee State Department of Education)

[17] Basic Skills First, p. 11.

independent of metropolitan and nonmetropolitan designations, both urban and rural areas occur inside and outside SMSAs. Examples of rural schools within the project were: East Tennessee, Ellen-Myers Primary (Claiborne County), Middle Tennessee, Celina Elementary (Clay County), West Tennessee, and East Chester Elementary (Chester County).[18]

STAR Project (Student/Teacher Academic Ratio) is a four-year longitudinal study of class size. The study is being conducted by the Tennessee State Department of Education to determine the effects of a reduced pupil/teacher ratio on the achievement of students in public schools.

In this study, Socioeconomic Economic Status (SES) refers to whether the child does or does not qualify for free or reduced lunch. A student in the public schools can possibly qualify for either free l reduced lunch through the federally subsidized schoo nchroom program. There are strict guidelines which apply to qualifications. These are guidelines which have been established by Congress. To qualify for free or reduced lunch, the parent or guardian must complete a form and return it to the school. The basis for free or reduced lunch is determined by a combination of income and family size. The information on the form is then verified by the school principal or cafeteria manager.

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[18] U.S. Department of Commerce, p. 51. (Definition supplied by Tennessee State Department of Education)

A suburban area is a population concentration of at least fifty thousand inhabitants, generally consisting of an inner city and the surrounding, closely settled, contiguous territory (suburbs). The UA criteria defined a boundary based primarily on a population density of at least one thousand persons per square mile, but also include some less densely settled areas, and such areas as industrial parks and railroad yards, if they are within areas of dense urban development. The density level of one thousand persons per square mile corresponds approximately to the continuously built-up area around a city(ies). The "urban fringe" is that part of the UA outside of a central city(ies). Typically, an entire UA is included within an SMSA. The SMSA is usually much larger in terms of territory covered and includes territory where the population density is less than one thousand. Occasionally, more than one UA is located within an SMSA. In some cases a small part of a UA may extend beyond an SMSA boundary or possibly into an adjacent SMSA. A few 1980 UAs have been defined in areas which do not meet the criteria for SMSA designation. UAs may cross State boundaries. In a few cases a UA does not include all of an "extended city," that is, a place which is determined to have a significant amount of rural territory. Examples of suburban schools within the project were: East Tennessee, Middlesettlements Elementary (Blount County), Middle Tennessee, Andrew Jackson

(Davidson County), West Tennessee, and Double Tree Elementary (Memphis City).[19]

The Basic Skills First Program is designed to facilitate the teaching and learning of reading and mathematics. The materials were written by Tennessee educators for use with Tennessee students. Specifically, the Program is designed to help local school personnel in their continuing task of insuring that all students in the Tennessee public schools learn the basic skills of reading and mathematics and develop the ability to apply them as needed in everyday life. The Program includes a comprehensive list of skills which specifies, defines, and numbers, by grade, the reading or mathematics skills for kindergarten through eighth grade.[20]

Urban and rural are type-of-area concepts rather than specific areas outlined on maps. As defined by the Census Bureau, the urban population comprises all persons living in urbanized areas (UAs) and in places of 2,500 or more inhabitants outside UAs. The rural population consists of everyone else. Therefore, a rural classification need not imply farm residence or a sparsely settled area, since a small city or town is rural as long as it is outside a UA and has fewer than 2,500 inhabitants. The terms urban and rural are independent of metropolitan and nonmetropolitan designations,

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[19] Ibid. (Definition supplied by Tennessee State Department of Education)

both urban and rural areas occur inside and outside SMSAs. Examples of urban schools within the project were: East Tennessee, Jonesborough Elementary (Washington County), Middle Tennessee, College Street Elementary (Manchester City), West Tennessee, and Trenton Elementary (Trenton Special School District).[21]

WORDID as used in this study identifies the composite scores of the total of the five Tennessee Basic Skills tested word identification objectives.

Organization of the Study

The study was divided into five chapters. Chapter I introduces the statement of the problem, the significance of the problem, the purpose of the study, limitations of the study, the research hypothesis, definition of terms, and the organization of the study. Chapter II presents a review of the related literature. Chapter III explains the methodology and design of the study, including the sampling process, the instrument, and procedures used. Chapter IV provides an analysis of the data. Chapter V includes the findings of the study with conclusions and recommendations.

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[21] U.S. Department of Commerce. (Definition supplied by Tennessee State Department of Education)

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Introduction

The purpose of this chapter was to describe the following: (1) the population and sample investigated in this study, (2) the procedures for this study, (3) the instruments and measures used in this study, and (4) the statistical treatment applied in the analysis of the data collected.

Population and Sample

The school systems from which the sample was drawn are located in the state of Tennessee and include inner city, urban, suburban, and rural areas and encompass the three grand divisions of the state. The state of Tennessee has 141 school systems. This includes 95 county school systems, 46 city school systems or special school districts, and 2 consolidated school systems. This includes approximately 991 elementary schools, 201 middle or junior high schools, 199 high schools, 51 seventh grade through twelfth grade schools, and 40 kindergarten through twelfth grade schools.

The sample of the study was determined by Basic Skills First Records submitted by kindergarten teachers involved in the first year of Project STAR. The teachers had been

randomly assigned to class sizes by the Tennessee State Department of Education. The individual schools randomly assigned students to classes using a model which was developed by the consortium. Thirty-eight elementary schools that serve rural, urban, suburban, and inner-city schools participated in the project. There were twenty-six school systems involved. Approximately 2,837 students were included in the study. The school systems involved are shown in Table 1.

Procedures

This study was a component in Project STAR, a four-year longitudinal study of class size conducted by the Tennessee State Department of Education. The project began in the school year 1985-86 and will follow most of the same students from kindergarten through the third grade. The design of the study was an in-school design. In order to have an in-school design, there had to be at least fifty-seven kindergarten students enrolled in the individual schools. The design of the project is shown in Table 2.

> The legislation defined a small class as having between thirteen and seventeen students, with an average of fifteen. A regular class had between twenty-two and twenty-five students, with an average of 22.8. Each participating school had at least three or more classes; at least one small class with thirteen to seventeen students, one regular class of twenty-two to twenty-five students, and one regular class with a full-time teacher aide with twenty-two

Table 1

Schools Involved in Kindergarten Reading Readiness Achievement Study

School	No. of Teachers Reporting Data	No. of Students with Reading Readiness Data
Thomas Elementary	3	63
Pikeville Elementary	3	70
Bungalow Elementary	1	5
Middlesettlements Elementary	3	63
Rockford Elementary	3	61
East Chester Elementary	5	107
Tazewell-New Tazewell	6	125
Celina Elementary	4	64
North Coffee Elementary	3	45
College Street Elementary	3	52
East Lincoln Elementary	4	46
Parsons	4	64
York	4	77
Hancock Central	3	54
Savannah North	3	58
Waverly	6	118
Jefferson	3	86
Lawrenceburg	4	72
South Lawrence	3	62
Lewis County	6	118
Nichols	5	101
Enon	5	99
South Pittsburg	4	59
South Fulton	4	80
Pickett County	3	57
Spring City	5	100
A. B. Hill	2	116
Double Tree	4	99
Goodlet	4	89
Hanley	6	118
Lincoln	2	62
Raineshaven	3	39
Raleigh-Barlett	2	47
Riverview	5	113
Trousdale County	4	81
Unicoi	1	18
Collinwood	3	64
Finlay	4	85

Table 2

Student/Teacher Ratio--In-School Design

Number of Students in the School	Number of Classes Per School
57-67	1 Experimental Class (1:13-17) 1 Regular Class (1:22-25) 1 Regular Class with a full-time aide (1:22-25)
68-78	2 Experimental Classes 1 Regular Class 1 Regular Class with a full-time aide
79-92	1 Experimental Class 1 Regular Class 2 Regular Classes with a full-time aide or 1 Experimental Class 2 Regular Classes 1 Regular Class with an aide
93-109	2 Experimental Classes 2 Regular Classes 1 Regular Class with an aide or 2 Experimental Classes 1 Regular Class 2 Regular Classes with an aide
110-134	2 Experimental Classes 2 Regular Classes 2 Regular Classes with an aide
135+	These will be individually designed with as near a balance as possible of the three types.

to twenty-five students. Larger schools had more classes distributed among the three types.[1]

[1] Tennessee State Department of Education, Reduced Student/Teacher Ratio Pilot Information Sheet, pp. 1-3.

A student in a small class in kindergarten will stay in the small class for grades one, two, and three so the cumulative effect of the class type can be measured. In this study, there were 59 experimental (small), 53 regular, and 46 regular classes, with a full-time teacher aide of kindergarten students. The data were taken from information gathered in the 1985-86 school year.

Instruments and Measures

The Tennessee Kindergarten Basic Skills First reading skills for STAR Project classes for 1985-86 were the source of the data to be analyzed. The Tennessee Basic Skills First Program is a component of the Comprehensive Education Reform Act. As mandated by state law, school systems within the state could either utilize the Basic Skills First Program or develop a comparable program to identify mastery of basic skills by students. Only STAR Project schools using the Tennessee Basic Skills First kindergarten skill objectives were included in the sample. The Tennessee Basic Skills First Program identified 661 minimum competency objectives in grades kindergarten through eight in the area of reading, with 242 of these objectives identified as tested objectives. In 1985-86, there were 74 identified reading readiness objectives for kindergarten, and 25 of these were tested objectives. Tests were designed by the state for the 242

objectives to identify mastery of the skills. Documentation of skills mastered was recorded by the teacher for individual students. The basic skills reading objectives were divided into three strands which included word identification skills, comprehension skills, and reference and study skills. The objectives for kindergarten reading tested and analyzed in this study were: give personal data, name body parts, name/associate five senses, identify colors, identify four basic shapes, use prepositions/position words, name similar objects, name parts/uses of objects, speak in complete sentences, describe contents of pictures, retell a story in order, repeat sections from memory, match word with picture, arrange three to four pictures in order, match picture/story sequence, draw and color main idea, predict ending, make up an ending, answer factual questions, select/explain picture for story, identify name, identify first and last names, match word with word card, select matching letters or words, name capital and lower case letters.

Specifically, data were collected from individual or group profiles on kindergarten students involved in the STAR Project. The profiles were recorded to indicate mastery or non-mastery of the skills tested. Also analyzed were personal data on students, including sex, race, attendance, and socio-economic status (SES). The SES refers to whether a child received free or reduced lunch. The population size of the

community in which the school is located in regard to urban, rural, inner city, or suburban was also contained in the data. Attendance was obtained through the eight attendance periods as reported to the state of Tennessee by the local school systems.

Statistical Treatment

The study was designed to investigate the relationship between class size and achievement and specific variables relating to students and the classroom environment. All statistical data were tested at the .05 level of significance. The following statistical treatments were applied to the data:

1. To determine if statistically significant differences exist in the composite of the twenty-five reading readiness objectives (MASTERY) among the three class groups, a crosstabulation procedure with a chi-square test of significance and a five-way analysis of variance (class type, sex, socioeconomic status, geographic localities, attendance) was computed.

2. To determine if statistically significant differences existed in the composite of the twenty item comprehension strand of the reading readiness objectives (READCOMP) among the three class groups, a crosstabulation procedure with a chi-square test of significance and a five-way analysis of variance was computed.

3. To determine if statistically significant differences existed in the composite of the five item word identification strand (WORDID) of the reading readiness objectives among the three class groups, a crosstabulation procedure with a chi-square test of significance and a five-way analysis of variance was computed.

4. To determine if statistically significant differences existed in the twenty-five individual reading readiness objectives among the three class groups, a crosstabulation procedure with a chi-square test of significance was computed.

CHAPTER IV

RESULTS AND ANALYSIS

This chapter reports major results of data obtained to determine if significant differences existed in kindergarten reading readiness achievement in kindergarten children in regard to size of the class which the child attended. The major measures of reading readiness achievement were the twenty-five Tennessee Basic Skills kindergarten objectives which were divided into subcategories of reading comprehension skills, word identification skills, and reference and study skills. Only the reading comprehension and word identification strands which contained tested skills for kindergarten reading readiness are included.

The term MASTERY identifies the composite score for mastery of the total of the twenty-five objectives. READCOMP defines the composite score of the twenty reading comprehension objectives in the kindergarten reading Basic Skills. WORDID refers to the composite score of the five word identification objectives for kindergarten reading Basic Skills.

The five independent variables were class size (1:15, 1:25, and 1:25 with full-time aide), sex (male and female), socioeconomic status, geographic localities, and attendance. Socioeconomic status was divided into free/reduced lunch and

non-free lunch categories. The four geographic categories included inner city, suburban, rural, and urban. The classification of schools into geographic localities was established by the Tennessee State Department of Education with guidelines from the United States Department of Commerce. Attendance was calculated by dividing the days present by the total number of days belonging (180). The attendance categories were 0-88 percent present, 89-93 percent present, 94-97 percant present, and 98-100 percent present

The major results and analyses of the study were reported in four parts:

1. An analysis of the effects of the five independent variables on the composite MASTERY scores; two-way interaction effects of composite MASTERY scores with the independent variables.

2. An analysis of the effects of the five independent variables on the composite reading comprehension scores; two-way interaction effects of the composite reading comprehension scores with the independent variables.

3. An analysis of the effects of the five independent variables on the composite word identification skills; two-way interaction effects of the composite word identification scores with the independent variables.

4. An analysis of the independent variables by a comparison of the number of students categorized by the number

of objectives mastered in the areas of MASTERY, READCOMP, WORDID, and each of the twenty-five reading readiness objectives individually.

The analysis of parts one, two, and three was accomplished by use of an Analysis of Variance (ANOVA). Part four of the analysis applied a nonparametric statistical procedure of crosstabulation with a chi-square test of significance.

The total student sample for the study was 2,837. There was an n of 2,426 students in the ANOVA. There were 622 students in the small class analysis. The regular class analysis contained 940 students. The regular class with a full-time aide contained 864 students. There was an n of 2,799 in the crosstabulation analysis. This included 725 in the small class, 1,074 in the regular class, and 1,000 in the regular class with full-time aide.

Analysis of Variance

There were 2,426 students in the analysis. The study employed a 4x4x3x2x2 factorial design with class size (small, regular, and regular plus a full-time aide), sex, socioeconomic status, geographic localities, and attendance as the independent variables and a composite of the twenty-five Reading Readiness Objectives (MASTERY) as the dependent variable. As shown in Table 3, the results of the analysis of variance of MASTERY disclosed that there was a statistically significant difference among all of the main effects

Table 3

Analysis of Variance Summary: MASTERY[#]

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
Main Effects					
Class Type	310.20	2	155.10	7.51	0.001**
Sex	367.52	1	367.52	17.79	0.000**
Socioeconomic status (SES)	2,475.34	1	2,475.34	119.80	0.000**
Geographic localities (GEOLO)	3,552.85	3	1,184.29	57.32	0.000**
Attendance	501.65	3	167.22	8.09	0.000**
2-Way Interactions					
Class Type Sex	165.52	2	82.76	4.01	0.018*
Class Type SES	107.61	2	53.81	2.60	0.074
Class Type GEOLO	813.62	6	135.60	6.56	0.000**
Class Type Attend	114.04	6	19.01	0.92	0.479
Sex SES	15.57	1	15.57	0.75	0.385
Sex GEOLO	42.50	3	14.17	0.69	0.561
Sex Attend	157.77	3	52.59	2.55	0.054
SES GEOLO	546.56	3	182.19	8.82	0.000**
SES Attend	85.35	3	28.45	1.38	0.248
GEO Attend	398.69	9	44.30	2.14	0.023*
Error	49,113.71	2,377	20.66		
Total	61,951.11	2,425	25.55		

[#] MASTERY = Composite score of the twenty-five items mastered.

* $p = <.05$

** $p = <.01$

2,837 cases processed; 411 missing cases.

not only at the .05 alpha level, but also at .01. There were statistically significant differences in the two-way interactions between the categories of: class type and sex ($p = .018$); class type and geographic localities ($p = .000$); socioeconomic status and geographic localities ($p = .000$); and geographic localities and attendance ($p = .023$).

In the analysis of the main effects, as shown in Figure 1, the highest mean MASTERY score was the small class with 22.3 out of 25 objectives. The lowest mean MASTERY score was 21.3 for the regular class. The regular class plus a full-time aide's mean MASTERY score of 21.7 was only .4 above the regular class.

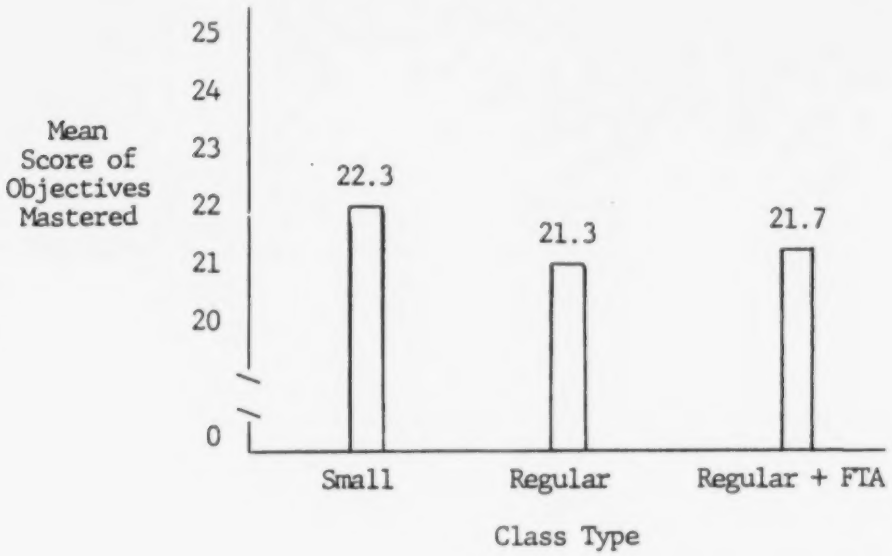

Figure 1

Analysis of Variance Main Effects:
MASTERY by Class Type

As shown in Figure 2, the mean MASTERY score was 22.1 for females and 21.3 for males. On the 25 reading readiness objectives females obtained a slightly higher mean MASTERY score than the males on the objectives attempted. Although this was a small gain, it was significant at .01. This slight difference could be accounted for by the maturity of girls at this age.

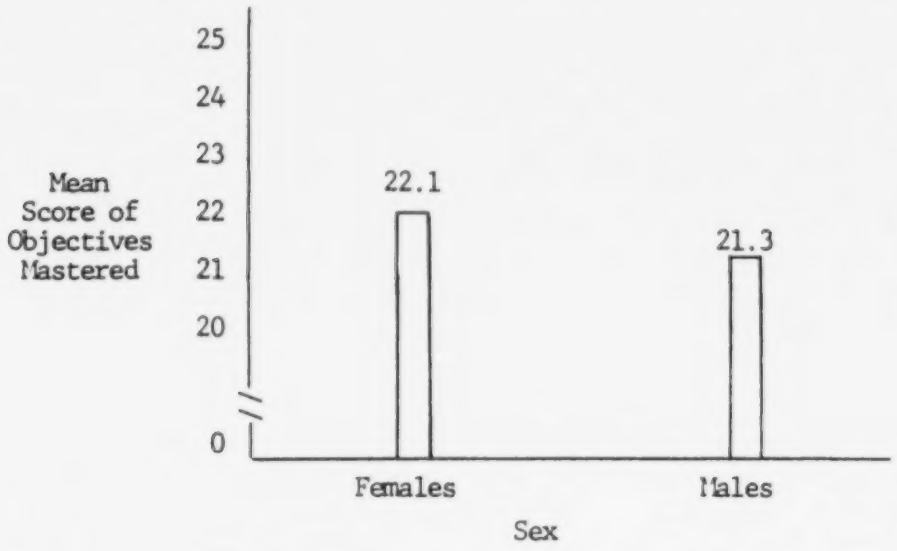

Figure 2

Analysis of Variance Main Effects:
MASTERY by Sex

In the MASTERY analysis of variance, there were two categories for socioeconomic status (SES), free/reduced lunch and non-free lunch. There were 1,171 students in the free/reduced lunch category and 1,255 in the non-free lunch group. As shown in Figure 3, the mean MASTERY score for free/reduced

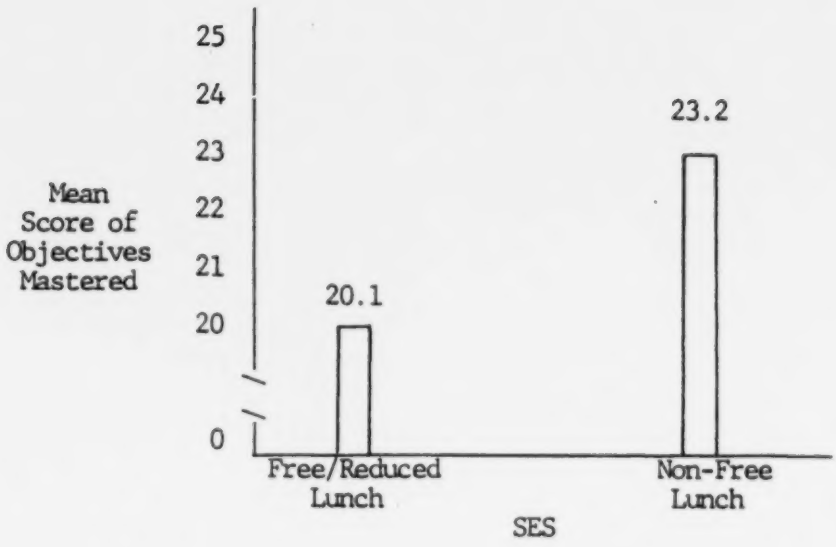

Figure 3

Analysis of Variance Main Effects:
MASTERY by Socioeconomic Status

lunch students was 20.1 and 23.2 for the non-free lunch students. This 3.1 difference in the mean score of objectives mastered is one of the greatest that was found in the study.

In the analysis for MASTERY by geographic localities there were 316 students in the inner city group. The suburban group contained 273 students. There were 1,567 students in the rural group and 270 in the urban group.

As shown in Figure 4, the mean MASTERY score for the inner city students was 18.1. The mean MASTERY score for the suburban category was 22.2. Rural students obtained a mean MASTERY score of 22.6, and urban students obtained a mean MASTERY score of 20.1. In the four geographic

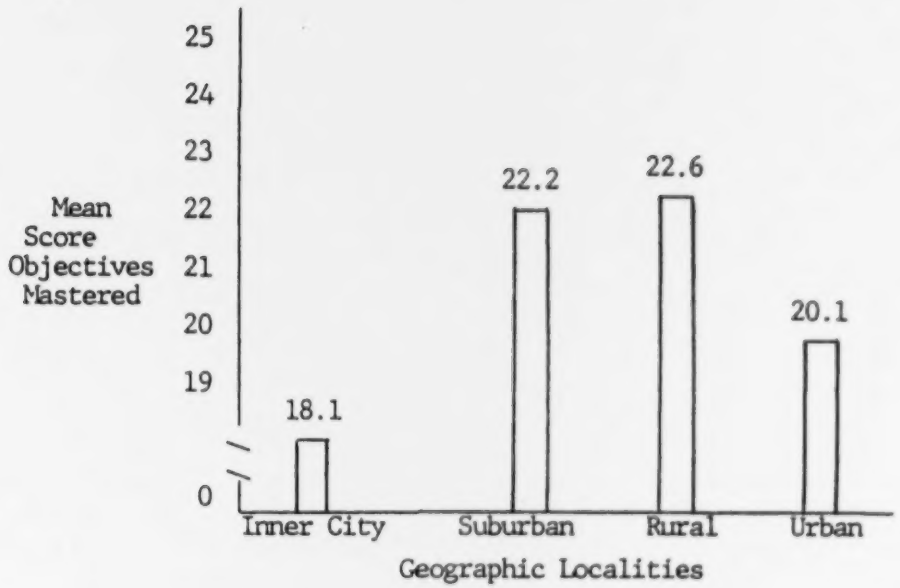

Figure 4

Analysis of Variance Main Effects: MASTERY by Geographic Localities

localities, rural students obtained the highest mean score (22.6). The lowest mean score (18.1) for MASTERY by geographic localities was recorded for the inner city group.

There were four attendance categories in the analysis of variance. The first category (0-88 percent present) included 299 students. The second (89-93 percent present) contained 523 students, and 809 students fell into the 94-97 percent present category. Finally, there were 795 students who fell into the attendance category of 98-100 percent present.

As shown in Figure 5, the mean MASTERY score for the first attendance category (0-88 percent present) was

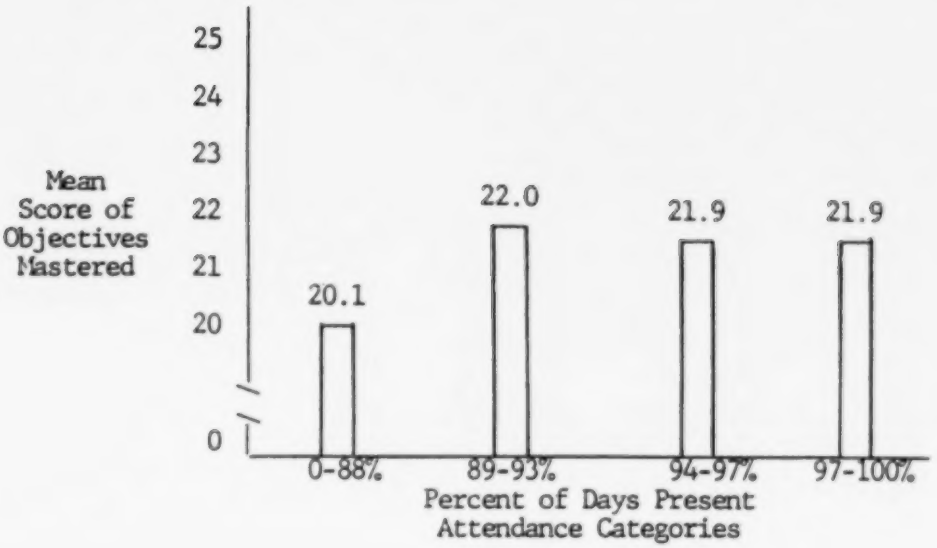

Figure 5

Analysis of Variance Main Effects:
MASTERY by Attendance

20.1. In the second attendance category (89-93 percent present), the mean MASTERY score was 22.0. For the 94-97 percent present category, the mean MASTERY score was 21.9. In the 98-100 percent present category, the mean MASTERY score was 21.9 objectives mastered. Out of the four attendance categories, the lowest number of objectives mastered (20.1) was in the 0-88 percent present category. The mean MASTERY scores in the other three categories were similar with the highest mean MASTERY score (22.0) recorded in the second attendance category (89-93 percent present). It would seem from this study that students who attended at least 90 percent of the time do as well as students who attend 100 percent of the time.

Although a significant difference was found in each main effect, this was not always the case in the ten two-way interaction analyses. In the presentation of the analysis, each two-way interaction is represented with a bar graph. When a significant difference was found, an interaction graph is also presented. In the two-way interaction for MASTERY of class type by sex, there were 309 females and 313 males in the small class; 474 females and 466 males in the regular class; and the regular class plus a full-time aide analysis contained 431 females and 433 males for a total n of 2,426.

As shown in Figure 6, the mean MASTERY score for females in the small class type was 22.5, while the mean MASTERY score

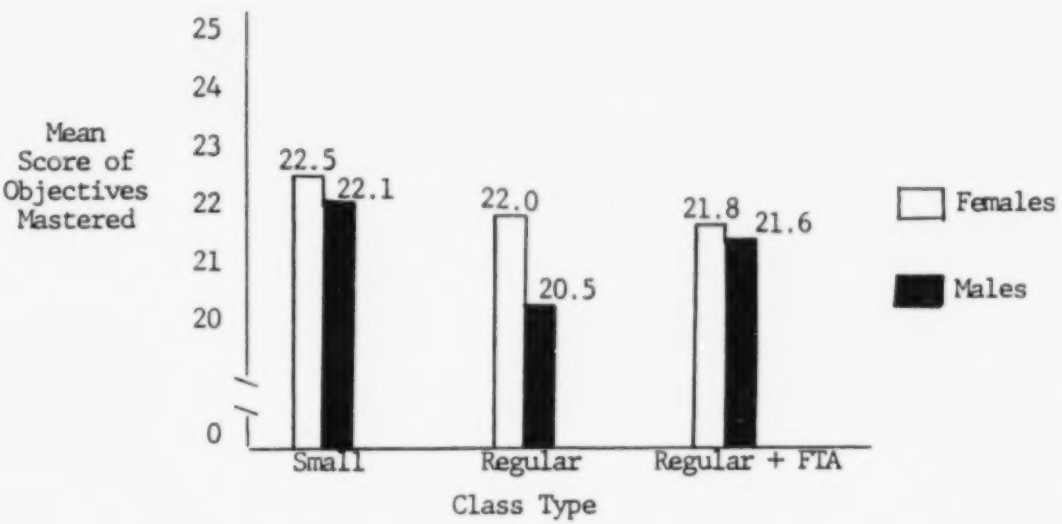

Figure 6

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Sex

for males was 22.1. Females in the regular class type obtained a mean MASTERY score of 22.0, and males obtained a mean score of 20.5. The mean MASTERY score for females in the regular class plus a full-time aide was 21.8 and for males the mean MASTERY score was 21.6. Females and males in the small class type obtained the highest mean MASTERY scores of the three class types analyzed. Females in each class type obtained higher mean MASTERY scores than males. The lowest score (20.5) was recorded for males in the regular class type. The highest score (22.5) was recorded for females in the small class type.

In addition, as shown in Figure 7, there was a statistically significant interaction at the .05 alpha level among

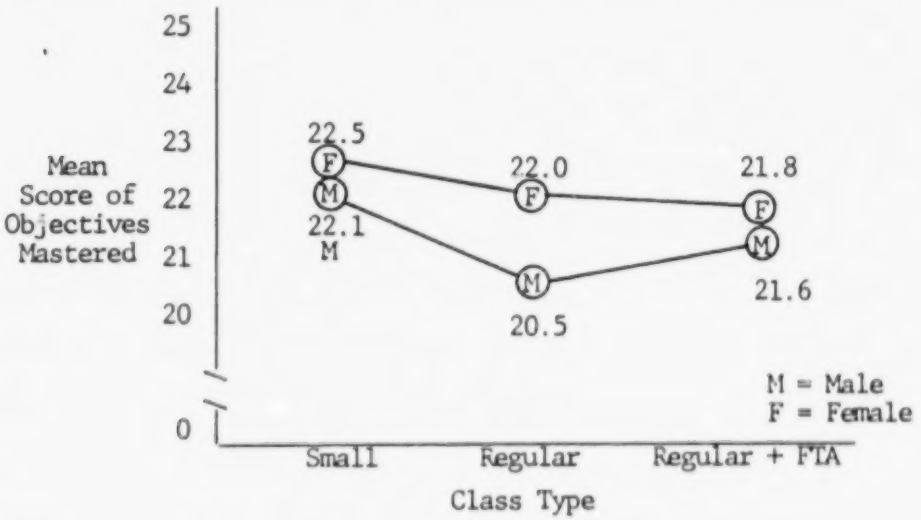

Figure 7

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Sex

the three class types and the two sex types.

In the analysis for MASTERY of class size by socioeconomic status, there were 286 free/reduced lunch students and 336 non-free lunch students in the small class type. There were 445 free/reduced lunch and 495 non-free lunch students in the regular class. The regular class plus a full-time aide contained 440 free/reduced lunch students and 424 non-free lunch students. As shown in Figure 8, the mean MASTERY score for free/reduced lunch students in the small class was 21.0 and 23.4 for the non-free lunch students. The mean MASTERY score for free/reduced lunch students in the regular class was 19.3 and 23.0 for the non-free lunch students. Free/

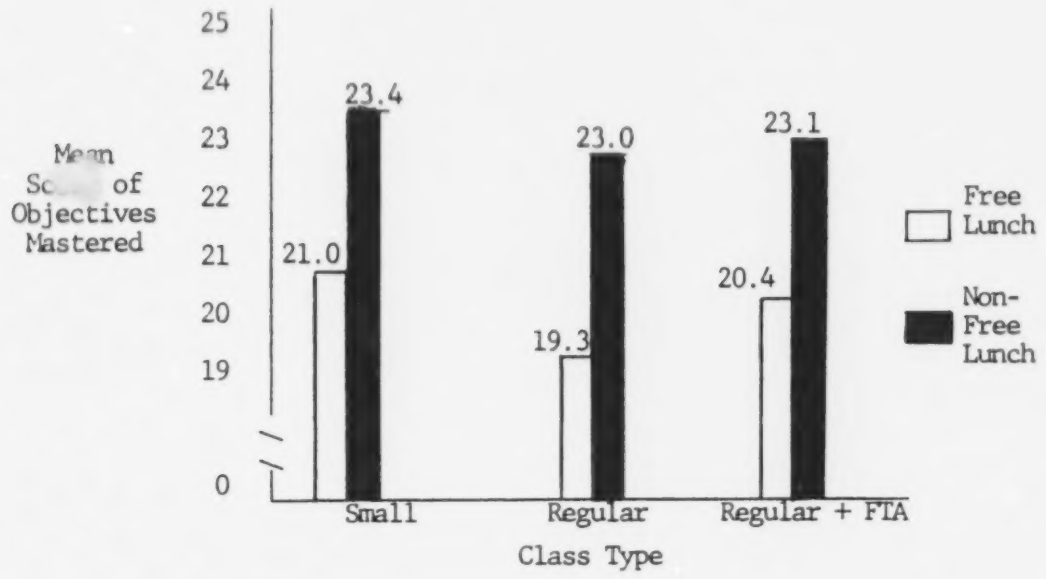

Figure 8

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Socioeconomic Status

reduced lunch students in the regular class with a full-time aide obtained a mean MASTERY score of 20.4 while non-free lunch students' mean MASTERY score was 23.1. The highest mean MASTERY score (23.4) was recorded for non-free lunch students in the small class. The lowest mean MASTERY score (19.3) was recorded for free/reduced lunch students in the regular class. Non-free lunch students in each class size scored higher than free/reduced lunch students in any category. Mean MASTERY scores of non-free lunch students did not vary greatly according to class types, however, comparatively there were lower overall scores for free/reduced lunch students and a wider variation existed between class types.

In the analysis for MASTERY of class type by geographic localities there were 66 inner city, 54 suburban, 442 rural, and 60 urban students in the small class. There were 139 inner city, 88 suburban, 621 rural, and 92 urban students in the regular class. There were 111 inner city, 131 suburban, 504 rural, and 118 urban students in the regular class plus a full-time aide.

As shown in Figure 9, the mean MASTERY score for the small class type for inner city students was 20.1, 23.3 for suburban students, 22.8 objectives for rural students, and 20.6 for urban students. In the regular class type, the mean MASTERY score was 17.3 for inner city students, 20.9 for suburban students, 22.6 for rural students, and 18.3 for

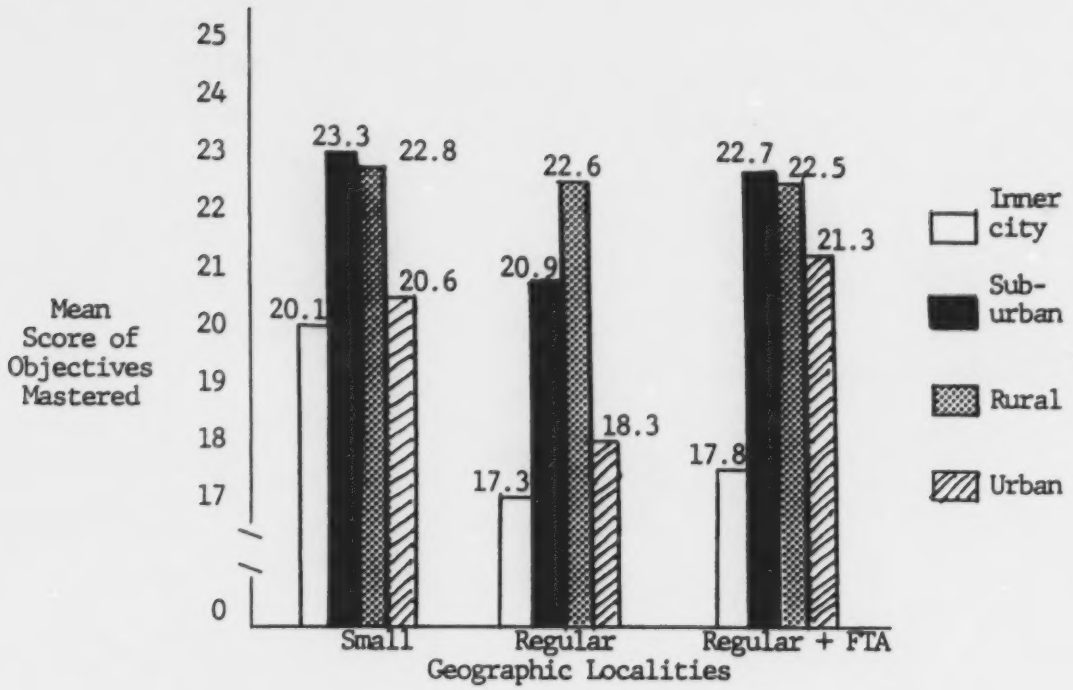

Figure 9

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Geographic Localities

urban students. The regular class plus a full-time aide mean MASTERY score for inner city students was 17.8, 22.7 for suburban students, 22.5 for rural students, and 21.3 for urban students. The highest mean MASTERY score (23.3) was obtained by suburban students in a small class. The lowest score (17.3) was obtained by inner city in a regular class. Inner-city students scored lower across all class types. Urban students obtained the next lowest scores across all class types. There were no other consistencies across class types in comparison with geographic localities.

Figure 10 displays a statistically significant interaction at the .01 alpha level among the three class types and the four geographic localities (F = 6.56, p = .000).

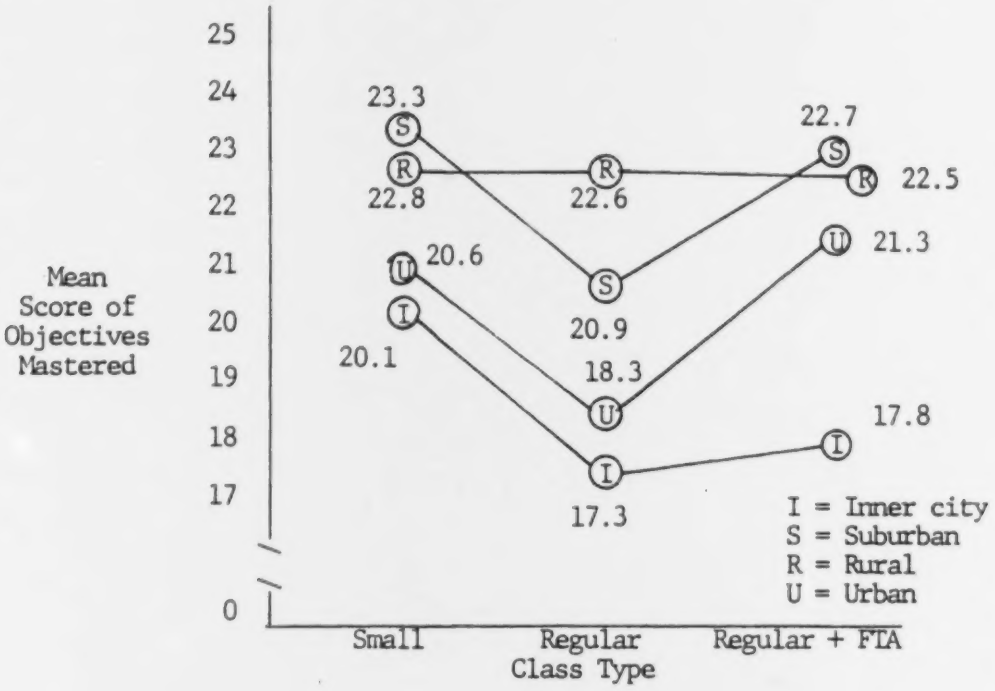

Figure 10

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Geographic Localities

In the analysis for MASTERY of class type by attendance there were 57 students in the first attendance category (0-88 percent present), 139 students in the 89-93 percent present category, 211 students in the 94-97 percent present category, and 215 students in the 98-100 percent present category in the small class. There were 119 students (0-88

percent present), 210 students (89-93 percent present), 321 students (94-97 percent present), and 290 students (98-100 percent present category) in the regular class. There were 123 students (0-88 percent present category), 174 students (89-93 percent present category), 277 students (94-97 percent present category), and 290 students (98-100 percent present category) in the regular class plus a full-time aide.

As shown in Figure 11, the mean MASTERY score for the small class type for the 0-88 percent present category was

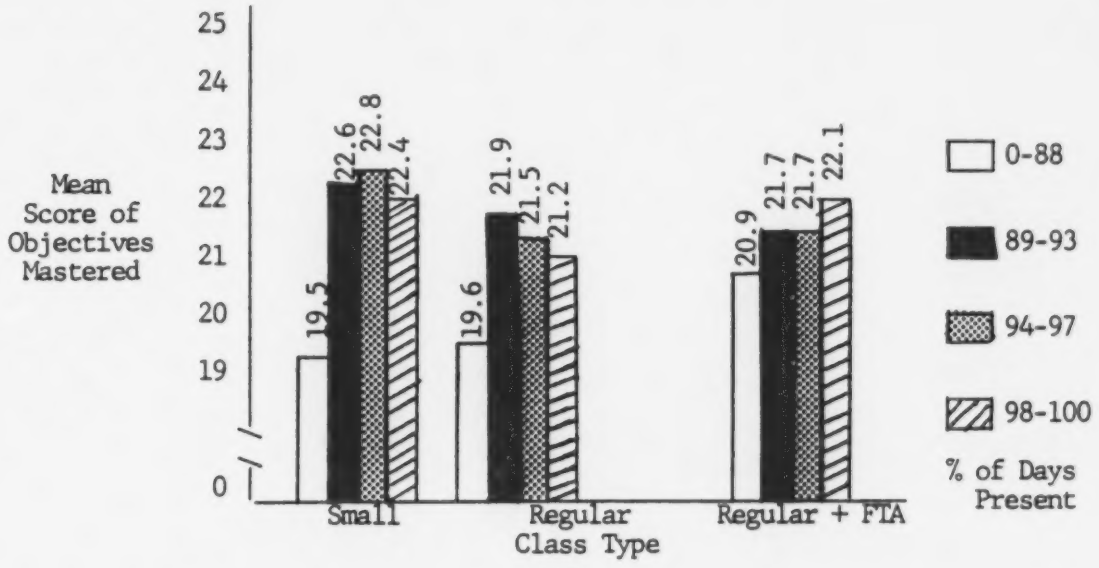

Figure 11

Analysis of Variance for Two-Way Interactions for MASTERY: Class Type by Attendance

19.5, 22.6 objectives for the 89-93 percent present category, 22.8 for the 94-97 percent present category, and 22.4 for the 98-100 percent present category. In the regular class type, the mean MASTERY score for the 0-88 percent present category was 19.6, 21.9 for the 89-93 percent present category, 21.5 for the 94-97 percent present category, and 21.2 for the 98-100 percent present category. For the regular class plus a full-time aide, the mean MASTERY score of the 0-88 percent present category was 20.9, 21.7 for the 89-93 percent present category, 21.7 objectives for the 94-97 percent present category, and 22.1 objectives for the 98-100 percent present category. Mean MASTERY scores for students in the small class type were higher than the two other class types in three of the percent present categories (89-93 percent present category, 94-97 percent present category, and 98-100 percent present category). However, the lowest mean MASTERY score obtained was in the small class with the 0-88 percent present category. In all of the three class sizes, the students in the lowest attendance category (0-88 percent present category), obtained significantly lower mean MASTERY scores. This study indicates that students who are not in school at least 85 percent of the time have less chance of succeeding in school.

In the analysis of MASTERY by sex and socioeconomic status there were 578 females in the free/reduced lunch

category and 636 females in the non-free lunch category. There were 593 males in the free/reduced lunch category and 619 males in the non-free lunch category.

As shown in Figure 12, the mean MASTERY score for females in the free/reduced lunch category was 20.5 and 23.5 for females in the non-free lunch category. The mean MASTERY

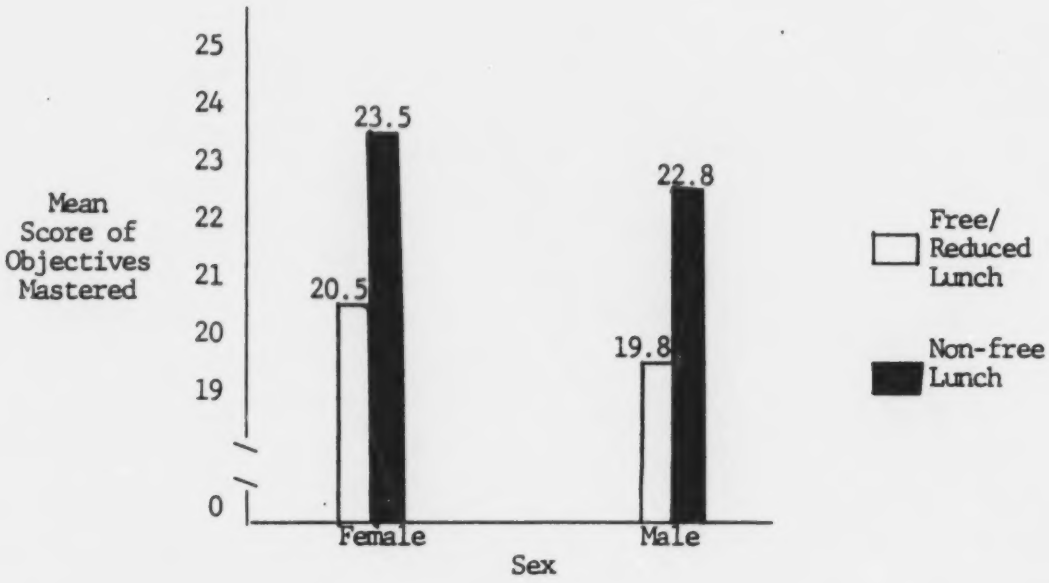

Figure 12

Analysis of Variance for Two-Way Interactions for MASTERY: Sex by Socioeconomic Status

score for males in the free/reduced lunch category was 19.8 and 22.8 for the males in the non-free lunch category. The lowest mean MASTERY score (19.8) was obtained by males in the free/reduced lunch category. The highest mean MASTERY score (23.5) was recorded for females in the non-free lunch

category. Both females and males in the non-free lunch category obtained higher mean MASTERY scores than females and males in the free/reduced lunch category.

In the analysis of MASTERY of sex by geographic localities, there were 168 females in the inner city, 142 females in the suburban, 769 females in the rural, and 135 females in the urban. There were 148 males in the inner city, 131 males in the suburban, 798 males in the rural, and 135 males in the urban. As shown in Figure 13, the mean MASTERY score for females in the inner city geographic locality was 18.2 and 17.8 for males. The mean MASTERY score for females in suburban geographic localities was 22.7 and 21.7 for males. In the

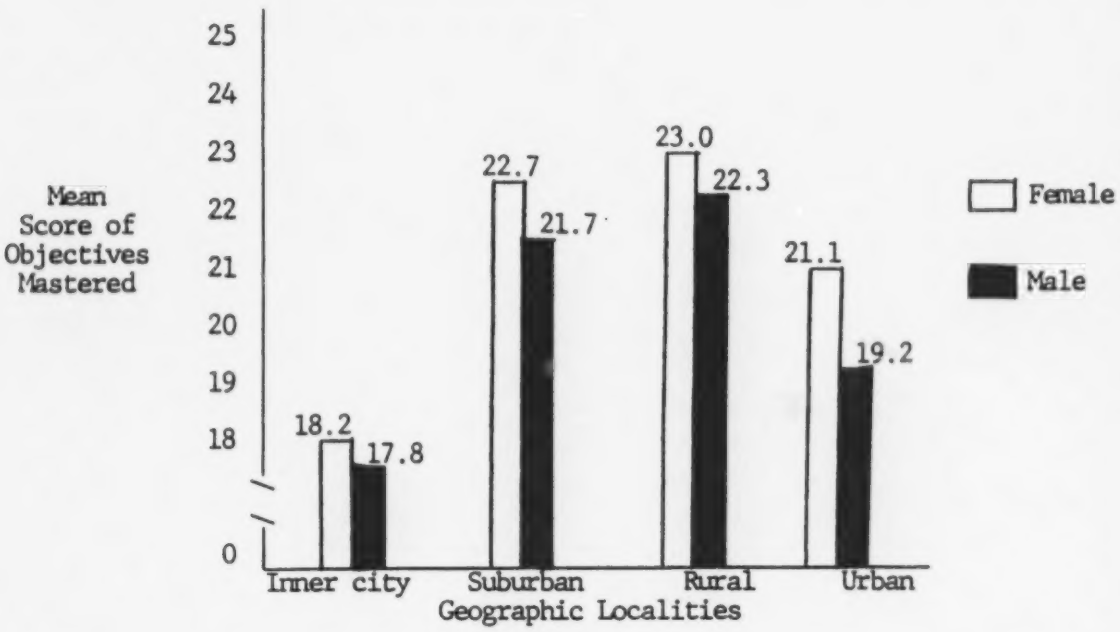

Figure 13

Analysis of Variance for Two-Way Interactions for MASTERY: Sex by Geographic Localities

rural geographic localities the mean MASTERY score was 23.0 for females and 22.3 for males. The mean MASTERY score for females in the urban geographic localities was 21.1 and 19.2 for males. The lowest mean MASTERY score (17.8) was obtained by male inner city students. The highest mean MASTERY score (23.0) was obtained by females in the rural geographic localities. Consistently higher scores were obtained by both females and males in suburban and rural schools as compared with mean MASTERY scores of both females and males in the inner city and urban geographic localities.

In the analysis of MASTERY of sex by attendance, there were 156 females in the 0-88 percent present category, 247 females in the 89-93 percent present category, 421 females in the 94-97 percent present category, and 390 females in the 98-100 percent present category. There were 143 males in the 0-88 percent present category, 276 males in the 89-93 percent present category, 388 males in the 94-97 percent present category, and 405 males in the 98-100 percent present category.

As shown in Figure 14, females in the 0-88 percent present category obtained a mean MASTERY score of 20.7 and males obtained a mean score of 19.5. In the 89-93 percent present category, the mean MASTERY score for females was 22.1 and 22.0 for males. For the 94-97 percent present category, the mean MASTERY score for females was 22.1 and 21.7 for males.

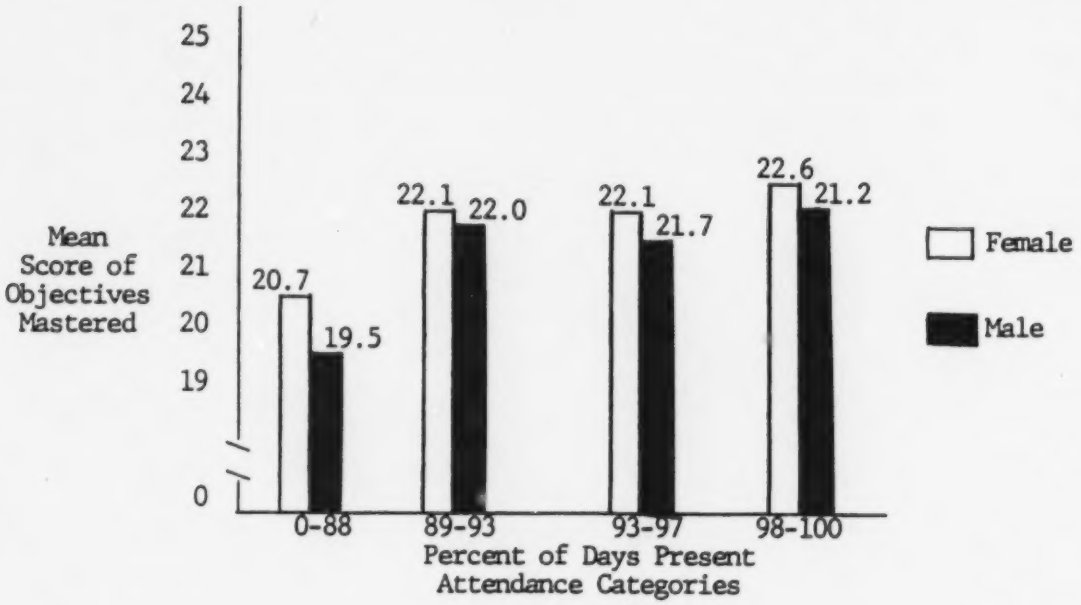

Figure 14

Analysis of Variance for Two-Way Interactions for MASTERY: Sex by Attendance

In the 98-100 percent present category, females obtained a mean MASTERY score of 22.6 objectives, while males' mean score was 21.2. The lowest mean MASTERY score (19.5) was obtained by males in the 0-88 percent present category, while the highest mean MASTERY score (22.6) was obtained by females in the 98-100 percent present category. Although the mean MASTERY scores were somewhat similar between the three highest attendance categories, females and males in the lowest (0-88 percent present category) obtained the lowest mean MASTERY scores.

In the analysis of MASTERY of socioeconomic status by geographic localities, there were 290 free/reduced lunch

inner-city students, 107 free/reduced lunch suburban students, 647 free/reduced lunch rural students, and 127 free/reduced lunch urban students. There were 26 non-free lunch inner city students, 166 non-free lunch suburban students, 920 non-free lunch rural students, and 143 non-free lunch urban students. As shown in Figure 15, the mean MASTERY scores for inner city students were 17.7 for free/reduced lunch students and 21.7 for non-free lunch students. The mean MASTERY scores for suburban students were 21.1 for free/reduced lunch students, and 22.9 for non-free lunch students.

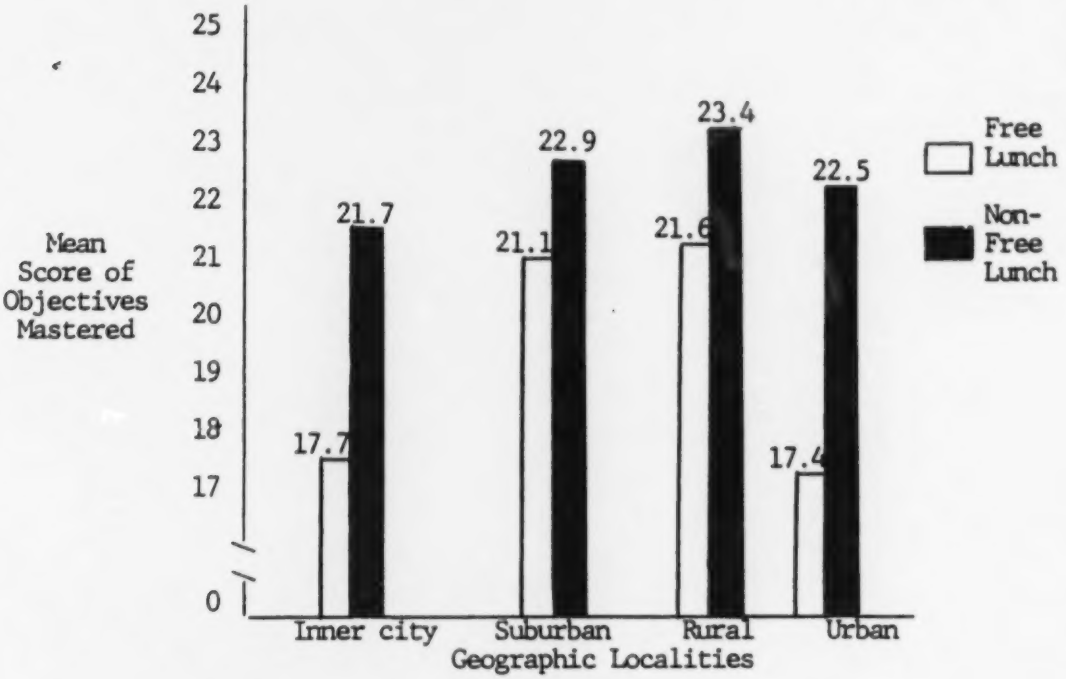

Figure 15

Analysis of Variance for Two-Way Interactions for MASTERY: Socioeconomic Status by Geographic Localities

In the rural geographic localities, the mean MASTERY scores were 21.6 for free/reduced lunch students and 23.4 for non-free lunch students. In the urban geographic localities the mean MASTERY scores were 17.4 for free/reduced lunch and 22.5 for non-free lunch students. The lowest mean MASTERY score (17.4) was obtained by free/reduced lunch students in urban geographic localities. The highest mean MASTERY score (23.4) was recorded for non-free lunch students in rural geographic localities. Mean MASTERY scores were lower for free/reduced lunch students in all geographic localities as compared with non-free lunch students. Non-free lunch students in inner city and urban geographic localities scored lower than non-free lunch students in suburban and rural areas. As shown in Figure 16, there was a statistically significant interaction at the .01 alpha level among the four geographic localities and the two socioeconomic status categories (F = 8.82, p = .000).

In the analysis of MASTERY of socioeconomic status by attendance, there were 191 free/reduced lunch students in the 0-88 percent present category, 249 free/reduced lunch students in the 89-93 percent present category, 379 free/reduced lunch students in the 94-97 percent present category, and 352 free/reduced lunch students in the 98-100 percent present category. There were 108 non-free lunch students in the 0-88 percent present category, 274 non-free lunch students in the

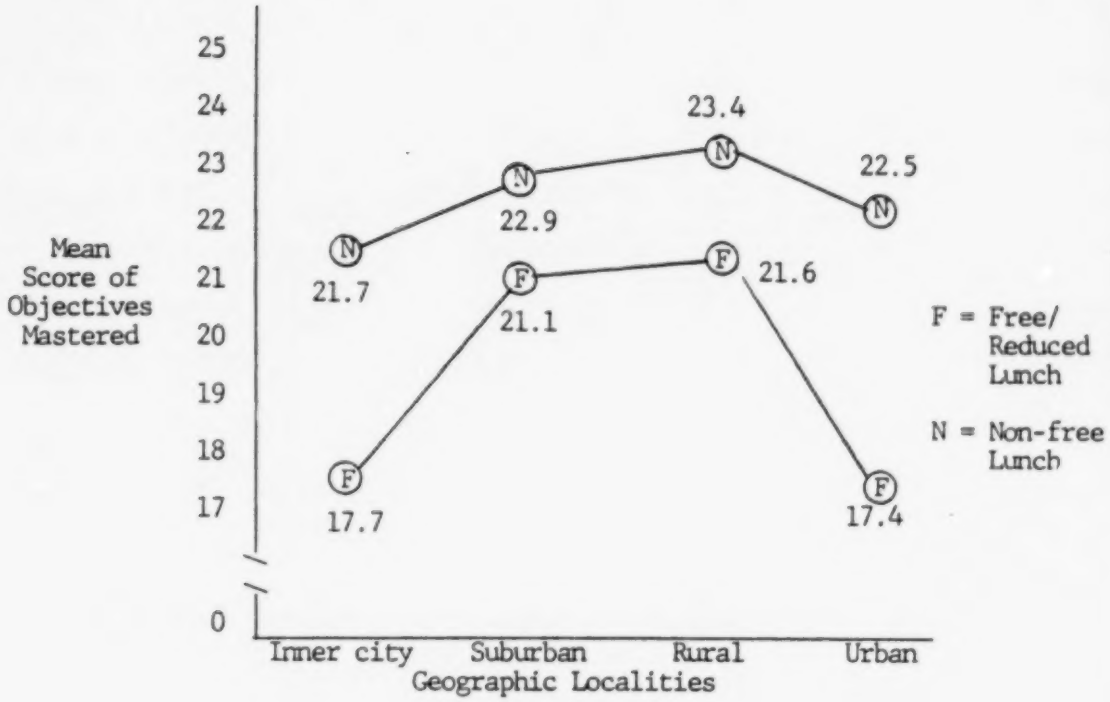

Figure 16

Analysis of Variance for Two-Way Interactions for MASTERY: Socioeconomic Status by Geographic Localities

89-93 percent present category, 430 non-free lunch students in the 94-97 percent present category, and 443 non-free lunch students in the 98-100 percent present category. As shown in Figure 17, the mean MASTERY scores in the 0-88 percent present category were 18.8 for free/reduced lunch students and 22.4 for non-free lunch students. In the 89-93 percent present category the mean MASTERY scores were 20.5 for free/ reduced lunch students and 23.4 for non-free lunch students. For the 94-97 percent present category the mean MASTERY scores were 20.3 for free/reduced lunch students and 23.3 for

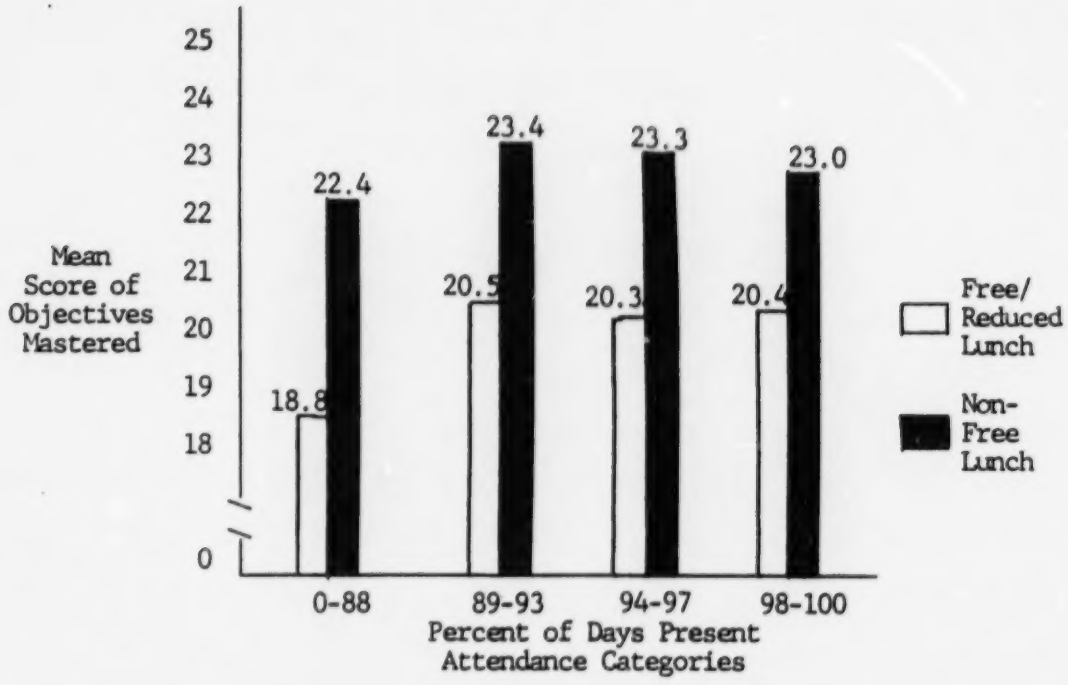

Figure 17

Analysis of Variance for Two-Way Interactions for MASTERY: Socioeconomic Status by Attendance

non-free lunch students. In the 98-100 percent present category, the mean MASTERY scores were 20.4 for the free/reduced lunch students and 23.0 for the non-free lunch students. The lowest mean MASTERY score (18.8) was obtained by free/reduced lunch students in the 0-88 percent present category. The highest mean MASTERY score (23.4) was recorded for non-free lunch students in the 89-93 percent present category. Free/ reduced lunch students obtained lower mean MASTERY scores in every attendance rate category than the non-free lunch students.

In the analysis of MASTERY of geographic localities by attendance, there were 40 inner city students in the 0-88 percent present category, 64 inner city students in the 89-93 percent present category, 83 inner city students in the 94-97 percent present category, and 129 inner city students in the 98-100 percent present category. For the suburban geographic localities, there were 22 students in the 0-88 percent present category, 51 students in the 89-93 percent present category, 82 students in the 94-97 percent present category, and 118 students in the 98-100 percent present category. For the rural geographic localities, there were 199 students in the 0-88 percent present category, 356 students in the 89-93 percent present category, 546 students in the 94-97 percent present category, and 466 students in the 98-100 percent present category. For the urban geographic localities, there were 38 students in the 0-88 percent present category, 52 students in the 89-93 percent present category, 98 students in the 94-97 percent present category, and 82 students in the 98-100 percent present category. As shown in Figure 18, the mean MASTERY scores for the 0-88 percent present category were: 16.6 for inner city students, 22.4 for suburban students, 21.3 for rural students, and 16.1 for urban students. The mean MASTERY scores for the 89-93 percent present category were: 18.1 for inner city students, 22.3 for suburban students, 22.8 for rural, and 21.4 for urban students. The

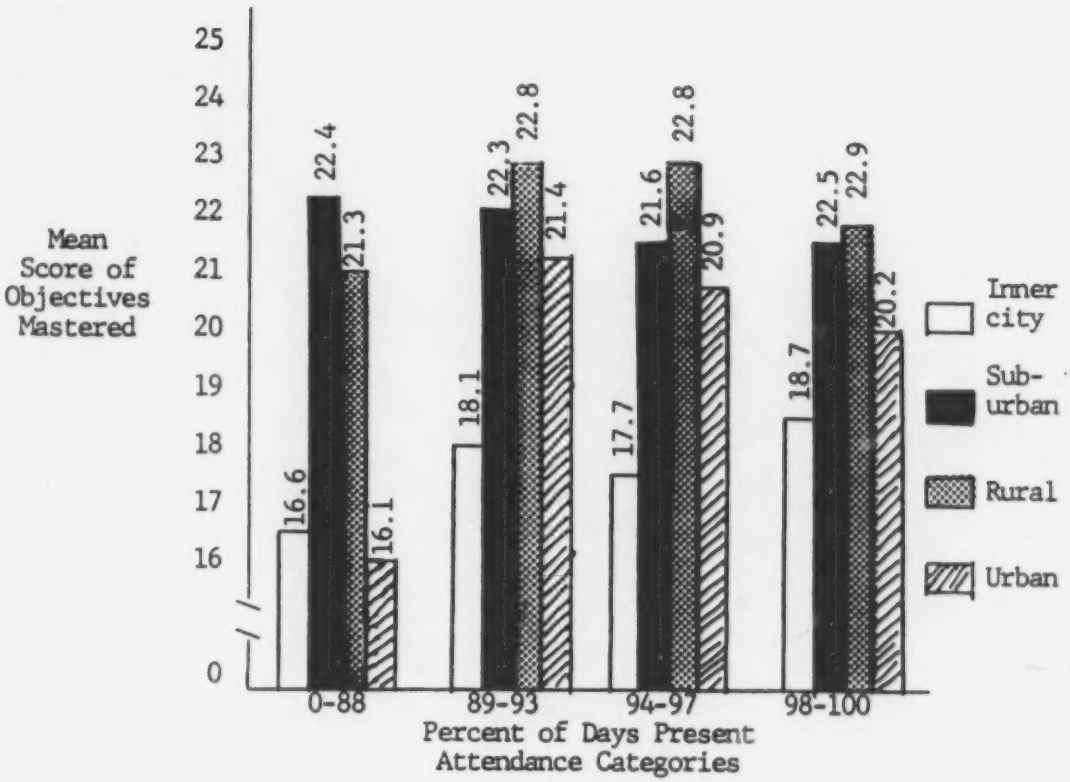

Figure 18

Analysis of Variance for Two-Way Interactions for MASTERY: Geographic Localities by Attendance

mean MASTERY scores for the 94-97 percent present category were: 17.7 for inner city, 21.6 for suburban students, 22.8 for rural students, and 20.9 for urban students. The mean MASTERY scores for the 98-100 percent present category were: 18.7 for the inner city, 22.5 for the suburban students, 22.9 for the rural students, and 20.2 for the urban students. The lowest mean MASTERY score (16.1) was obtained by urban students in the 0-88 percent present category. The highest mean

MASTERY score (22.9) was obtained by rural students in the 98-100 percent present category. As shown in Figure 19, there was a statistically significant interaction at the .05 alpha level among the four geographic localities and the four attendance rates ($F = 2.14$, $p = .023$).

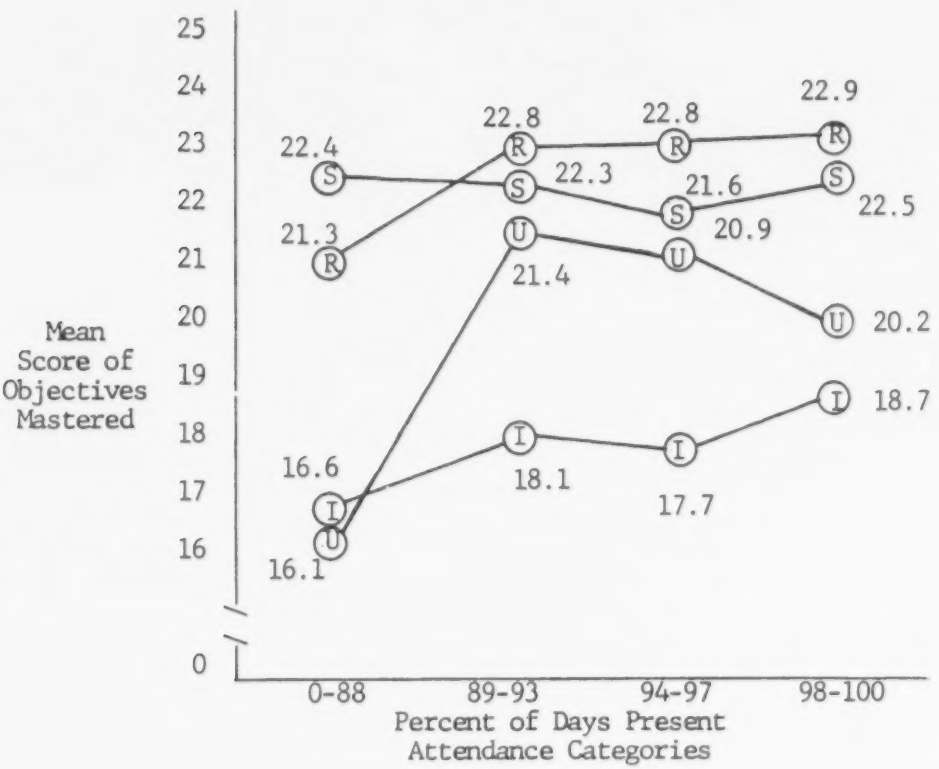

Figure 19

Analysis of Variance for Two-Way Interactions for MASTERY: Geographic Localities by Attendance

Basic Skills Reading Comprehensive Objectives

There were 2,426 students in the analysis. The study employed a 4x4x3x2x2 factorial design with class size (small, regular, and regular plus a full-time aide), sex (female, male), socioeconomic status (free/reduced lunch, non-free lunch), geographic localities (inner city, suburban, rural, urban), and attendance as the independent variables and the Basic Skills Reading Comprehensive Objectives (READCOMP) Composite as the dependent variable. As shown in Table 4, the results of the analysis of variance of READCOMP disclosed that there was a statistically significant difference among all of the main effects not only at the .05 alpha level, but also at .01. There were statistically significant differences in the two-way interactions between the categories of: class type and geographic localities ($p = .000$), socioeconomic status and geographic localities ($p = .000$), and geographic localities and attendance ($p = .027$).

In the analysis of the main effects, as shown in Figure 20, the highest mean READCOMP score was the small class with 17.9 of the 20 objectives. The lowest mean READCOMP score was 16.9 for the regular class. The regular class plus a full-time aide's mean READCOMP score of 17.3 was only .4 above the regular class.

As shown in Figure 21, the mean READCOMP score was 17.6 for females and 17.0 for males. Out of the 20 Reading

Table 4

Analysis of Variance: Summary: Reading Comprehension (READCOMP) #

Source of Variation		Sum of Squares	DF	Mean Square	F	Significance of F
Main Effects						
Class Type		279.99	2	140.00	10.08	0.000**
Sex		209.55	1	209.55	15.08	0.000**
Socioeconomic status (SES)		1505.67	1	1505.67	108.37	0.000**
Geographic Localities (GEOLO)		2526.78	3	842.26	60.62	0.000**
Attendance		384.41	3	116.14	8.36	0.000**
2-Way Interactions						
Cl Type	Sex	83.09	2	41.55	2.99	0.051
Cl Type	SES	59.45	2	29.73	2.14	0.118
Cl Type	GEOLO	557.76	6	92.96	6.69	0.000**
Cl Type	Attend	78.22	6	13.04	0.94	0.466
Sex	SES	4.60	1	4.60	0.33	0.565
Sex	GEOLO	12.52	3	4.17	0.30	0.825
Sex	Attend	79.01	3	26.34	1.90	0.128
SES	GEOLO	329.94	3	109.98	7.92	0.000**
SES	Attend	51.31	3	17.10	1.23	0.297
GEOLO	Attend	261.64	9	29.07	2.09	0.027*
Error		33025.31	2377	13.89		
Total		41561.75	2425	17.14		

READCOMP = Composite score of the twenty items mastered.

* $p < .05$

** $p < .01$

2,837 cases processes; 411 missing cases

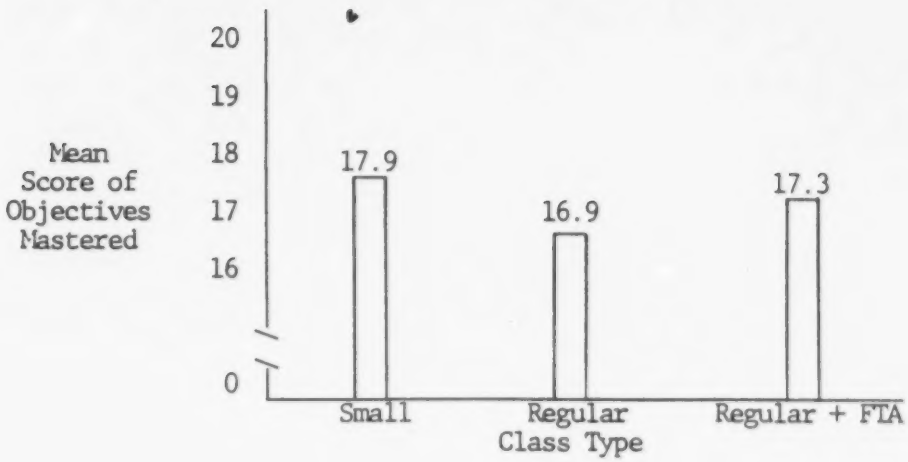

Figure 20

Analysis of Variance Main Effects: READCOMP
by Class Type

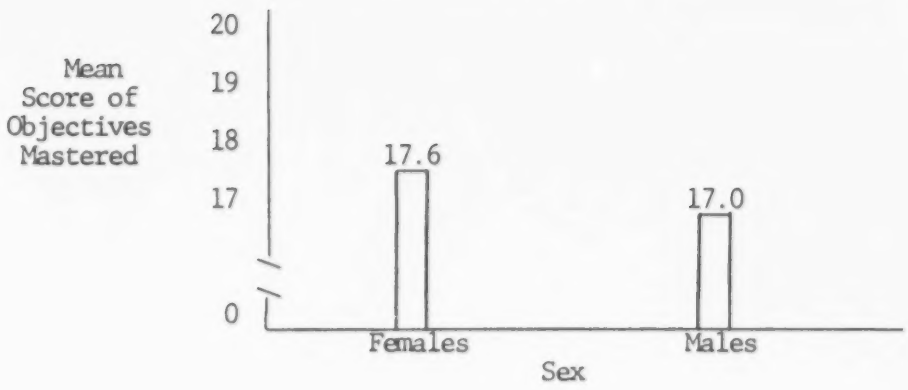

Figure 21

Analysis of Variance Main Effects:
READCOMP by Sex

Comprehension objectives, females obtained a slightly higher mean READCOMP score than the males on the objectives attempted. Although this was a small gain it was significant at .01.

In the READCOMP analysis of variance there were two categories for socioeconomic status (SES), free/reduced lunch and non-free lunch. There were 1,171 students in the free/reduced lunch category and 1,255 students in the non-free lunch group. As shown in Figure 22, the mean READCOMP score for free/reduced lunch students was 16.0 and 18.5 for the non-free lunch students. This 2.5 difference in the mean score

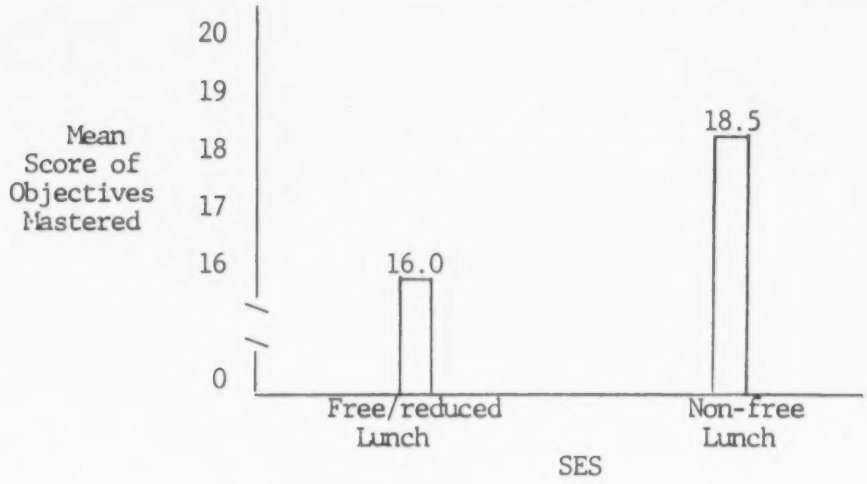

Figure 22

Analysis of Variance Main Effects: READCOMP by Socioeconomic Status

of objectives mastered is one of the greatest that was found in the study.

In the analysis of READCOMP by geographic localities, there were 316 students in the inner city group. The suburban group contained 273 students. There were 1,567 students in

the rural group and 270 in the urban group. As shown in Figure 23, the mean READCOMP score for inner city students was 14.2. The mean READCOMP score for the suburban geographic localities was 17.5. Rural students obtained a mean READCOMP score of 18.1, and urban students obtained a mean READCOMP score of 16.1. In the four geographic localities, rural students obtained the highest mean READCOMP score (18.1). The lowest mean READCOMP score (14.2) by geographic localities was obtained by inner city students.

There were four attendance categories in the READCOMP analysis of variance. The first category (0-88 percent

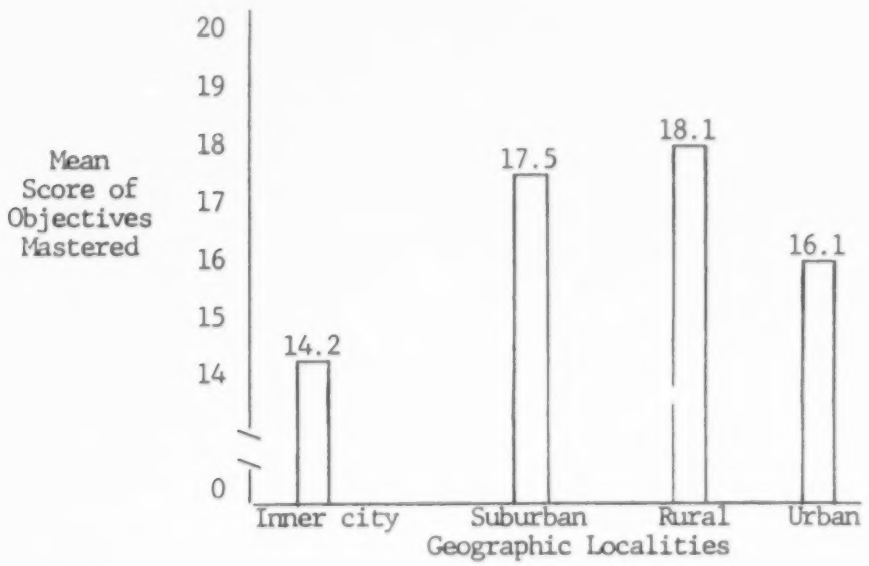

Figure 23

Analysis of Variance Main Effects: READCOMP by Geographic Localities

present) included 299 students. The second category (89-93 percent present) included 523 students, and 809 students were in the 94-97 percent present category. There were 795 students in the 98-100 percent present category.

As shown in Figure 24, the mean READCOMP score for the first attendance category (0-88 percent present) was 16.0, and for the second category (89-93 percent present) the mean READCOMP score was 17.6. For the 94-97 percent present category the mean READCOMP score was 17.5. In the 98-100 percent present category the mean READCOMP score was 17.4. In the four attendance categories, the lowest number of objectives mastered (16) was in the 0-88 percent present category.

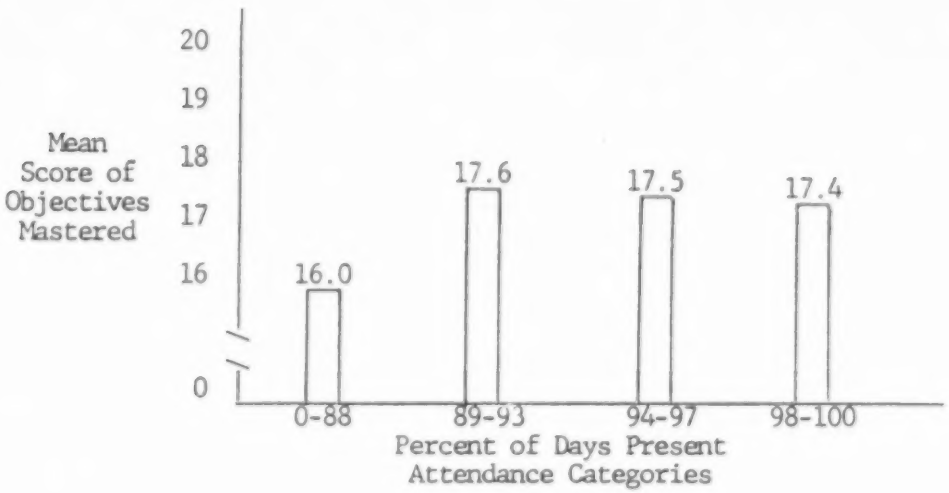

Figure 24

Analysis of Variance Main Effects: READCOMP by Attendance

There were similar mean READCOMP scores in the other attendance categories with the highest mean READCOMP score (17.6) recorded in the 89-93 percent category. It would seem from this study that students who attend at least 90 percent of the time do as well as students who attend 100 percent of the time.

Although a significant difference was found in each main effect, this was not always the case in the ten two-way interaction analyses. In the presentation of the analysis, each two-way interaction is represented with a bar graph. When a significant difference was found, an interaction graph is also presented. In the two-way interaction for READCOMP of class type by sex there were 309 females and 313 males in the small class. There were 474 females and 466 males in the regular class, and the regular class plus a full-time aide analysis contained 431 females and 433 males for a total n of 2,426. As shown in Figure 25, the mean READCOMP score for females in the small class type was 18.0, while the mean READCOMP score for males was 17.8. Females in the regular class type obtained a mean READCOMP score of 17.4, and males obtained a mean score of 16.3. The mean READCOMP score for females in the regular class plus a full-time aide was 17.4 objectives, and for males a mean score of 17.2 was obtained. Females and males in the small class type obtained the highest mean READCOMP scores of the three class types analyzed.

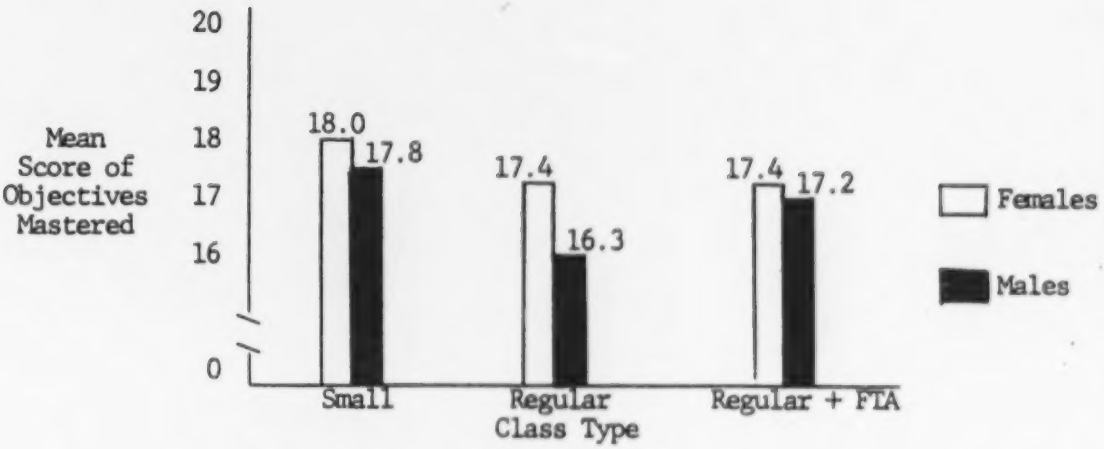

Figure 25

Analysis of Variance for Two-Way Interactions for READCOMP: Class Type by Sex

Females in each class size type obtained higher mean READCOMP scores than males. The lowest score (16.3) was recorded for males in the regular class type. The highest score (18.0) was recorded for females in the small class type.

In the analysis for READCOMP of class type by socio-economic status, there were 286 free/reduced lunch students and 336 non-free lunch students in the small class. There were 445 free/reduced lunch students and 495 non-free lunch students in the regular class. The regular class plus a full-time aide contained 440 free/reduced lunch students and 424 non-free lunch students. As shown in Figure 26, the mean READCOMP score for free/reduced lunch students in the small class was 16.9, and 18.7 for the non-free lunch students. The mean READCOMP score for students in the regular class type

was 15.3 for free/reduced lunch students and 18.3 for non-free lunch students. Free/reduced lunch students in the regular class plus a full-time aide obtained a mean READCOMP score of 16.2, while non-free lunch students' mean READCOMP score was 18.4. The lowest mean READCOMP score (15.3) was

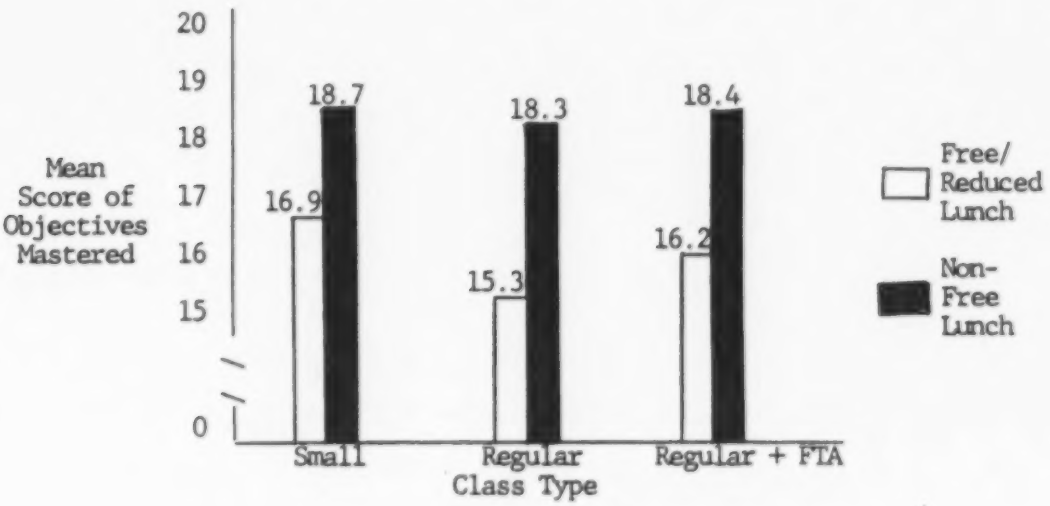

Figure 26

Analysis of Variance for Two-Way Interactions for READCOMP: Class Type by Socioeconomic Status

recorded for free/reduced lunch students in the regular class. The highest mean READCOMP score (18.7) was recorded for non-free lunch students in the small class. Mean READCOMP scores did not vary greatly for non-free lunch students across class types. However, free/reduced lunch students' overall scores were comparatively lower, and a wider variation existed between class types.

In the analysis for READCOMP of class type by geographic localities, there were 66 inner city, 54 suburban, 442 rural, and 60 urban students in the small class. There were 139 inner city, 88 suburban, 621 rural, and 92 urban students in the regular class. The regular class type plus a full-time aide contained 111 inner city, 131 suburban, 504 rural, and 118 urban students.

As shown in Figure 27, the mean READCOMP score for the small class type for inner city students was 15.8, 18.3 for suburban students, 18.4 for rural students, and 16.2 for urban students. In the regular class type the mean READCOMP score was 13.4 for inner city students, 16.4 for suburban students,

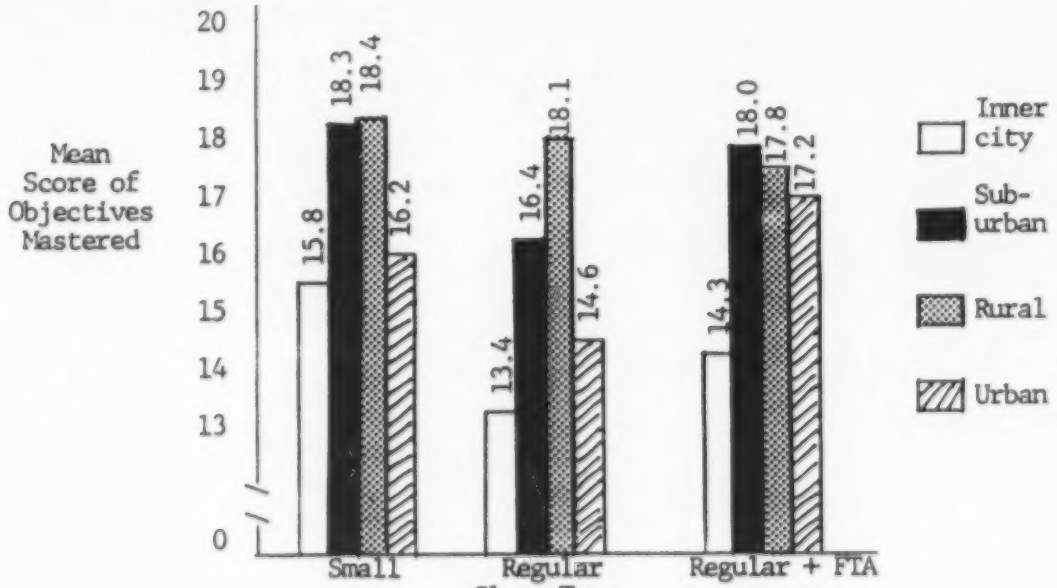

Figure 27

Analysis of Variance for Two-Way Interactions for READCOMP: Class Type by Geographic Localities

18.1 for rural students, and 14.6 for urban students. The mean READCOMP scores for the regular class type plus a full-time aide included 14.3 for inner city students, 18.0 for suburban students, 17.8 for rural students, and 17.2 for urban students. The lowest mean READCOMP score (13.4) was obtained by inner city students in the regular class type. The highest mean READCOMP score (18.4) was recorded for rural students in the small class type. Inner city students scored lower across all class types. Figure 28 displays a statistically significant interaction at the .01 alpha level among the three class types and the four geographic localities ($F = 6.69$, $p = .000$).

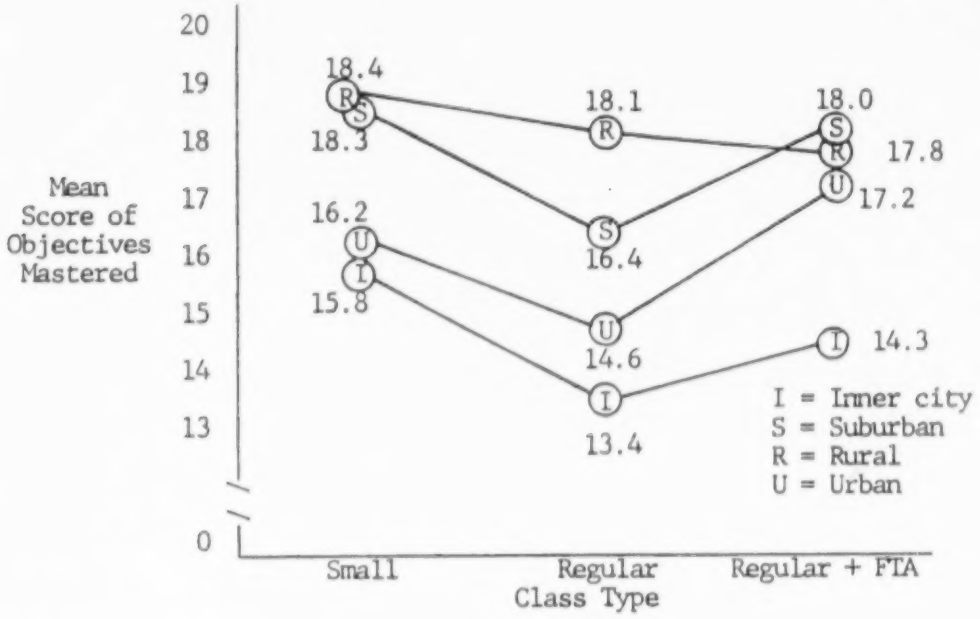

Figure 28

Analysis of Variance for Two-Way Interactions for READCOMP: Class Type by Geographic Localities

In the analysis for READCOMP of class type by attendance, there were 57 students in the first attendance category (0-88 percent present), 139 students in the 89-93 percent present category, 211 students in the 94-97 percent present category, and 215 students in the 98-100 percent present category in the small class. There were 119 students in the 0-88 percent present category, 210 students in the 89-93 percent present category, 321 students in the 94-97 percent present category, and 290 students in the 98-100 percent present category in the regular class. In the regular class plus a full-time aide, 123 students' attendance fell into the 0-88 percent present category, 174 into the 89-93 percent present category, 277 into the 94-97 percent category, and 290 into the 98-100 percent present category.

As shown in Figure 29, the mean READCOMP score for the small class for the 0-88 percent present category was 15.6, 18.1 for the 89-93 percent present category, 18.3 for the 94-97 percent present category, and 18.0 for the 98-100 percent present category. In the regular class, the mean READCOMP score for the 0-88 percent present category was 15.5, 17.4 for the 89-93 percent present category, 17.1 for the 94-97 percent present category, and 16.8 for the 98-100 percent present category. For the regular class plus a full-time aide, the mean READCOMP score for the 0-88 percent present category was 16.7, 17.3 for the 89-93 percent present category,

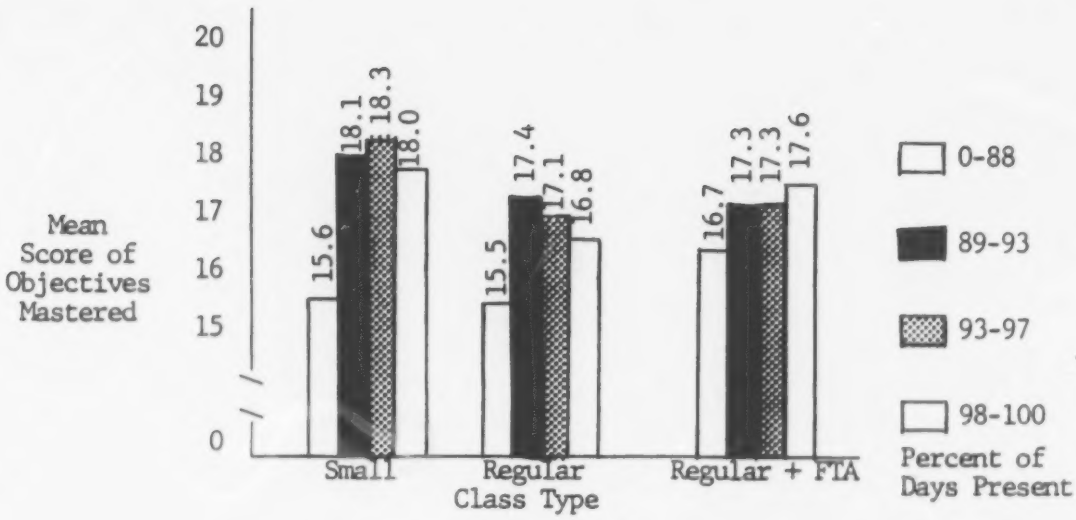

Figure 29

Analysis of Variance for Two-Way Interactions for READCOMP: Class Type by Attendance

17.3 objectives for the 94-97 percent present category, 17.6 for the 98-100 percent present category. Students in the small class obtained higher mean READCOMP scores in three of the attendance categories (89-93 percent present, 94-97 percent present, 98-100 percent present). The lowest mean READCOMP score (15.5) was obtained by students in the regular class in the lowest attendance category (0-88 percent present). Over all of the three class types, the students in the lowest attendance category (0-88 percent present) obtained significantly lower mean READCOMP scores. This study indicates that very low attendance is detrimental to achievement.

In the analysis of READCOMP by sex and socioeconomic status, there were 578 females in the free/reduced lunch

category and 636 females in the non-free lunch category. There were 593 males in the free/reduced lunch category and 619 males in the non-free lunch category.

As shown in Figure 30, females in the free/reduced lunch category obtained a mean READCOMP score of 16.3, while females in the non-free lunch category recorded a mean READCOMP score

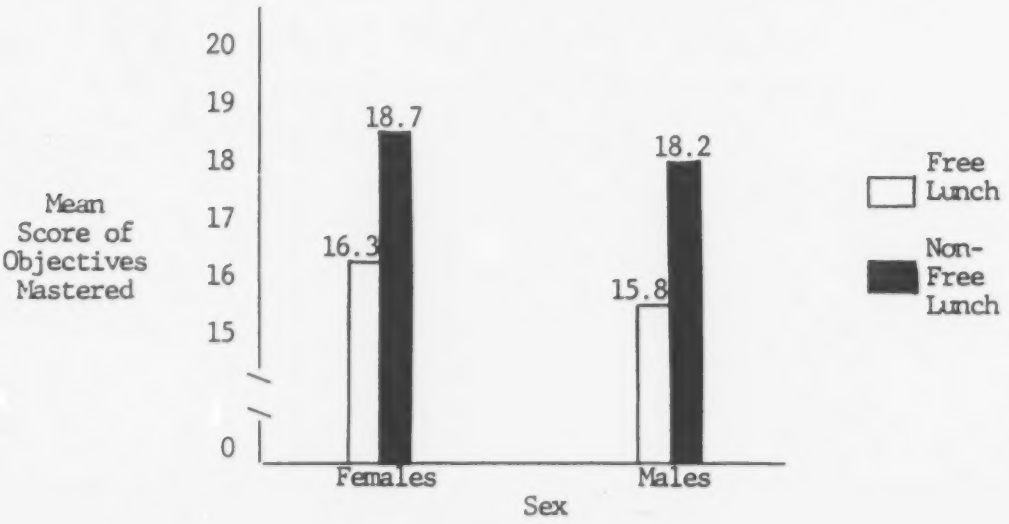

Figure 30

Analysis of Variance for Two-Way Interactions for READCOMP: Sex by Socioeconomic Status

of 18.7. Males in the free/reduced lunch category obtained a mean READCOMP score of 15.8, and males in the non-free lunch category recorded a mean READCOMP score of 18.2. The lowest mean READCOMP score (15.8) was obtained by males in the free/reduced lunch category. The highest mean READCOMP score (18.7) was recorded for females in the non-free lunch category.

Both females and males in the non-free lunch category obtained higher mean READCOMP scores than females and males in the free/reduced lunch category.

In the analysis of READCOMP of sex by geographic localities, there were 168 females in the inner city, 142 females in the suburban, 769 females in the rural, and 135 females in the urban. There were 148 males in the inner city, 131 males in the suburban, 798 males in the rural category, and 135 males in the urban. As shown in Figure 31 the mean READCOMP score for females in the inner city geographic locality was 14.5 and 13.9 for males. In the suburban geographic

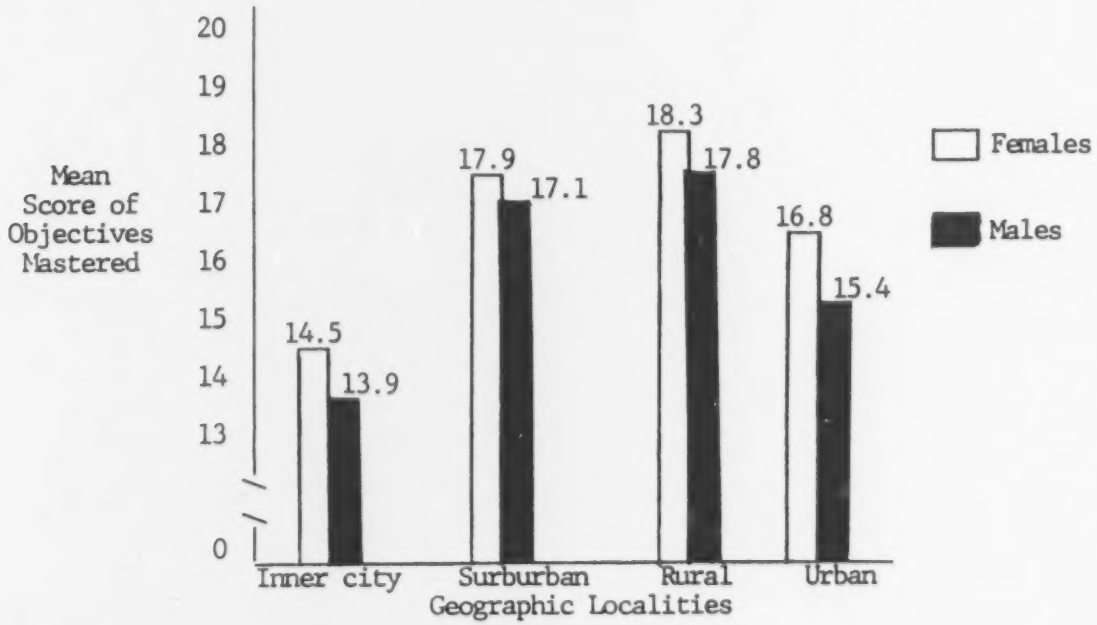

Figure 31

Analysis of Variance for Two-Way Interactions for READCOMP: Sex by Geographic Localities

locality the mean READCOMP score for females was 17.9 and 17.0 for males. The mean READCOMP scores in the rural geographic localities was 18.3 for females and 17.8 for males. The mean READCOMP score for females in the urban geographic localities was 16.8 for females and 15.4 for males. The lowest READCOMP score (13.9) was obtained by male inner city students. The highest mean READCOMP score (18.3) was obtained by females in the rural geographic localities. Consistently higher scores were obtained by both females and males in suburban and rural schools as compared with mean READCOMP scores of both females and males in the inner city and urban geographic localities.

In the analysis of READCOMP of sex by attendance, there were 156 females in the 0-88 percent present category, 247 females in the 89-93 percent present category, 421 females in the 94-97 percent present category, and 390 females in the 98-100 percent present category. There were 143 males in the 0-88 percent present category, 276 males in the 89-93 percent present category, 388 males in the 94-97 percent present category, and 405 males in the 98-100 percent present category.

As shown in Figure 32, the mean READCOMP score for females in the 0-88 percent present category was 16.4 and 15.5 for males. In the 89-93 percent present category, the mean READCOMP for females was 17.6 and 17.5 for males. For the 94-97 percent present category, the mean READCOMP score for

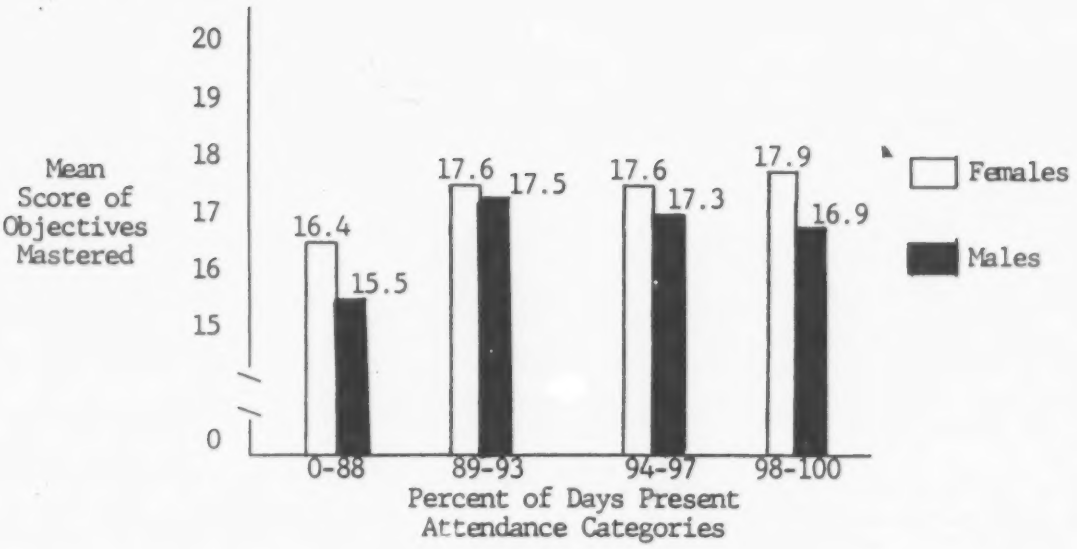

Figure 32

Analysis of Variance for Two-Way Interactions for READCOMP: Sex by Attendance

females was 17.6 and 17.3 for males. For the 98-100 percent present category, the mean READCOMP score for females was 17.9 and 16.9 for males. The lowest mean READCOMP score (15.5) was recorded for males in the lowest attendance category (0-88 percent present), while the highest mean READCOMP score (17.9) was obtained by females in the 98-100 percent present category.

In the analysis of READCOMP of socioeconomic status by geographic localities, there were 290 free/reduced lunch, inner city students; 107 free/reduced lunch, suburban students; 647 free/reduced lunch, rural students; and 127 free/reduced lunch urban students. There were 26 non-free lunch, inner

city students; 166 non-free lunch, suburban students; 920 non-free lunch, rural students; and 143 non-free lunch, urban students. As shown in Figure 33, the mean READCOMP scores for inner city students in the free/reduced lunch category were 14.0 and 17.0 for non-free lunch students. The mean READCOMP scores for suburban students in the free/reduced lunch category were 16.6 and 18.2 for non-free lunch students. In the rural geographic localities, the mean READCOMP scores for free/reduced lunch students were 17.3 and 18.6 for the non-free lunch category. In the urban geographic localities the mean READCOMP scores were 14.0 for free/reduced lunch students and 17.9 for non-free lunch students.

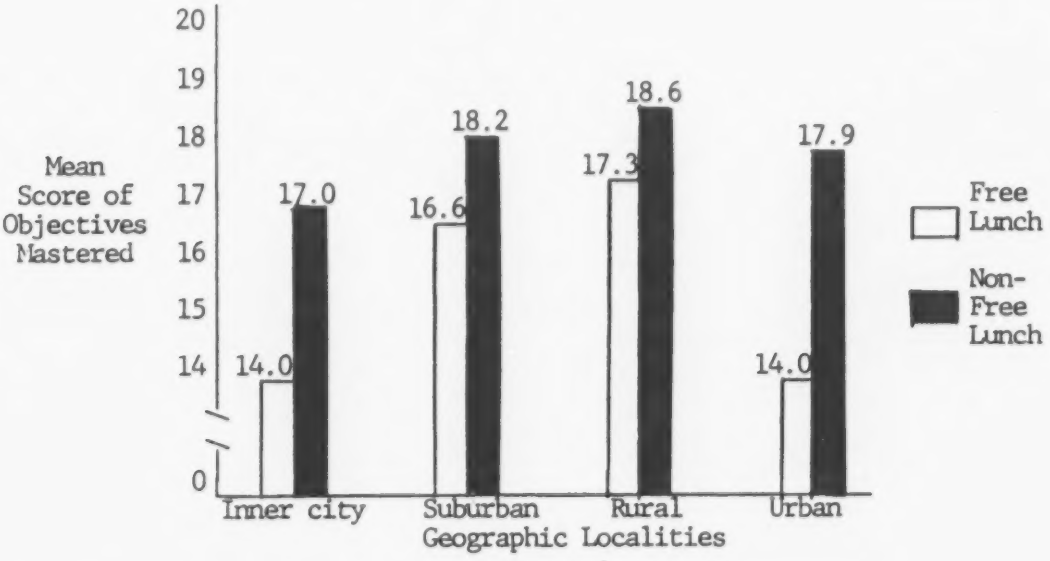

Figure 33

Analysis of Variance for Two-Way Interactions for READCOMP: Socioeconomic Status by Geographic Localities

The lowest mean READCOMP scores (14.0) was obtained by free/reduced lunch students in the inner city and urban geographic localities. The highest mean READCOMP score (18.6) was recorded for rural students in the non-free lunch category. Mean READCOMP scores were lower for free/reduced lunch students in all geographic localities when compared with non-free lunch students. Non-free lunch students in inner city and urban geographic localities scored lower than non-free lunch students in suburban and rural areas.

As shown in Figure 34, there was a statistically significant interaction at the .01 alpha level among the four

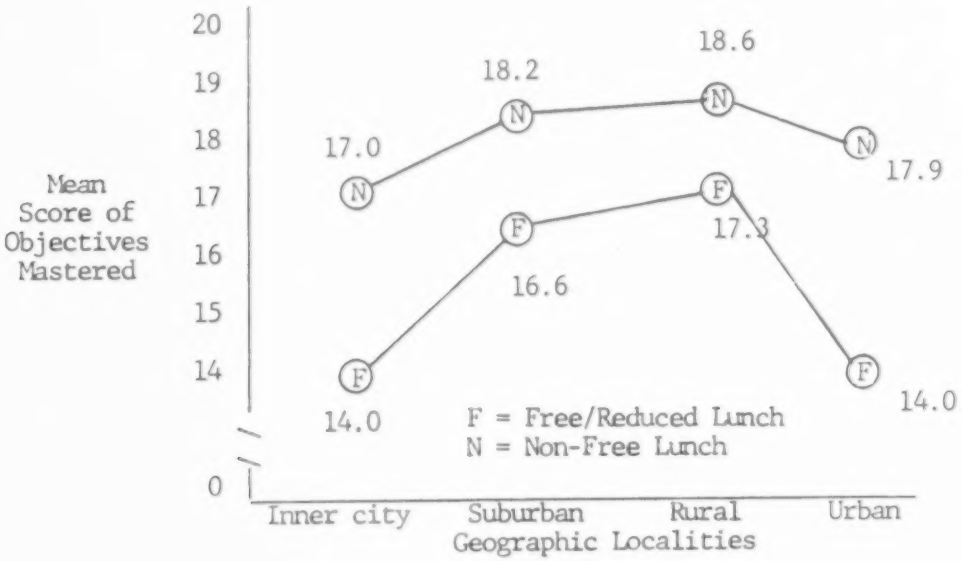

Figure 34

Analysis of Variance for Two-Way Interactions for READCOMP: Socioeconomic Status by Geographic Localities

geographic localities and the two socioeconomic status categories ($F = 7.92$, $p = .000$).

In the analysis of READCOMP of socioeconomic status by attendance, there were 191 free/reduced lunch students in the 0-88 percent present category, 249 free/reduced lunch students in the 89-93 percent present category, 379 free/reduced lunch students in the 94-97 percent present category, and 352 free/reduced lunch students in the 98-100 percent present category. There were 108 non-free lunch students in the 0-88 percent present category, 274 non-free lunch students in the 89-93 percent present category, 430 non-free lunch students in the 94-97 percent present category, and 443 non-free lunch students in the 98-100 percent present category.

As shown in Figure 35, the mean READCOMP scores in the 0-88 percent present category were 15.0 for the free/reduced lunch students and 17.8 for the non-free lunch students. In the 89-93 percent present category, the mean READCOMP scores were 16.3 for the free/reduced lunch students and 18.7 for the non-free lunch students. For the 94-97 percent present category, the mean READCOMP scores were 16.2 for the free/reduced lunch students and 18.6 for the non-free lunch students. In the 98-100 percent present category, the mean READCOMP scores were 16.2 for the free/reduced lunch students and 18.4 for the non-free lunch students. The lowest mean READCOMP score (15.0) was obtained by free/reduced lunch

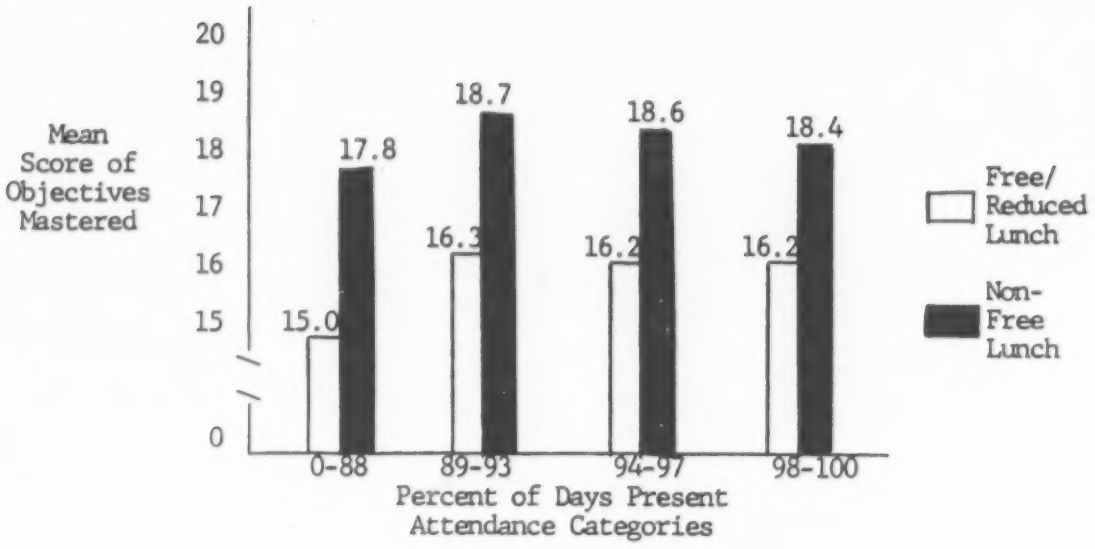

Figure 35

Analysis of Variance for Two-Way Interactions for READCOMP: Socioeconomic Status by Attendance

students in the 0-88 percent present category. The highest mean READCOMP score (18.7) was obtained by non-free lunch students in the 89-93 percent present category. Free/reduced lunch students obtained lower mean READCOMP scores in every attendance category as compared with non-free lunch students.

In the analysis of READCOMP of geographic localities by attendance, there were 40 inner city students in the 0-88 percent present category, 64 inner city students in the 89-93 percent present category, 83 inner city students in the 94-97 percent present, and 129 inner city students in the 93-100 percent present category. For the suburban geographic localities, there were 22 students in the 0-88 percent present category, 51 students in the 89-93 percent present category,

82 students in the 94-97 percent present category, and 118 students in the 98-100 percent present category. For the rural geographic localities, there were 199 students in the 0-88 percent present category, 356 students in the 89-93 percent present category, 546 students in the 94-97 percent present category, and 466 students in the 98-100 percent present category. For the urban geographic localities there were 38 students in the 0-88 percent present category, 52 students in the 89-93 percent present category, 98 students in the 94-97 percent present category, and 82 students in the 98-100 percent present category.

As shown in Figure 36, the mean READCOMP scores for the 0-88 percent present attendance category were: 12.9 for inner city students, 17.8 for suburban students, 17.0 for rural students, and 12.8 for urban students. The mean READCOMP scores for the 89-93 percent present attendance category were: 14.3 for inner city students, 17.8 for suburban students, 18.2 for rural students, and 17.1 for urban students. The mean READCOMP scores for the 94-97 percent present attendance category were: 14.1 for inner city students, 17.1 for suburban students, 18.2 for rural students, and 16.7 for urban students. The mean READCOMP scores for the 98-100 percent present attendance category were: 14.7 for inner city, 17.8 for suburban students, 18.3 for rural students, and 16.2 for urban students. The lowest mean READCOMP score (12.9)

was obtained by urban students in the 0-88 percent present category. The highest mean READCOMP score (18.3) was obtained by rural students in the 98-100 percent present category.

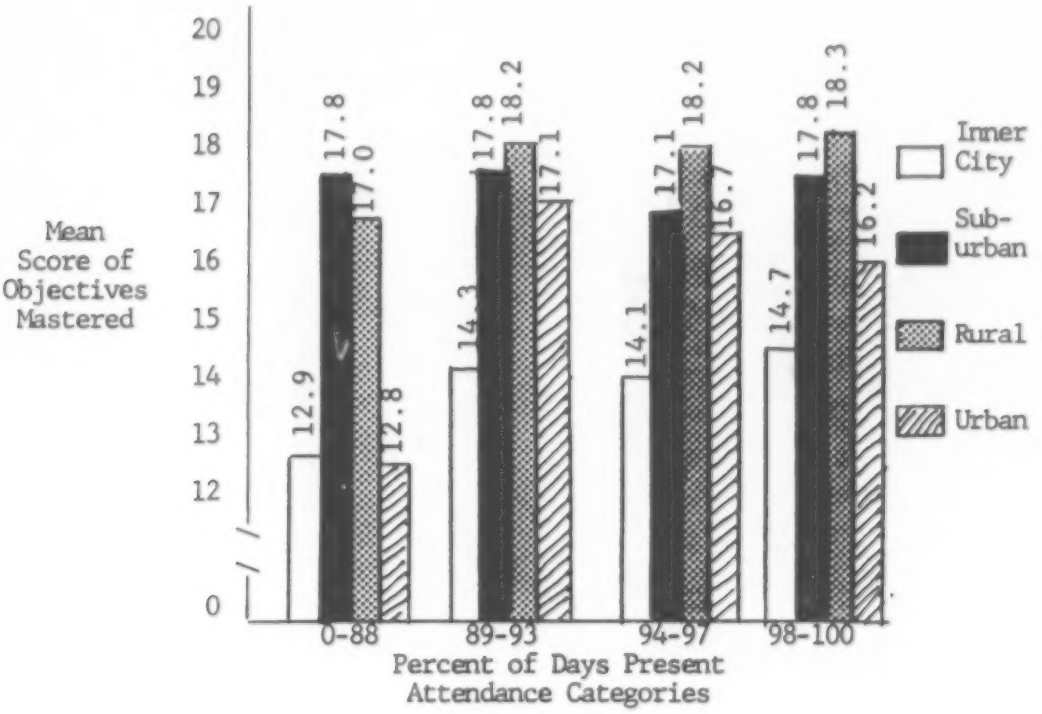

Figure 36

Analysis of Variance for Two-Way Interactions for READCOMP: Geographic Localities by Attendance

As shown in Figure 37, there was a statistically significant interaction at the .05 alpha level among the four attendance rates and the four geographic localities (F = 2.09. p = .027).

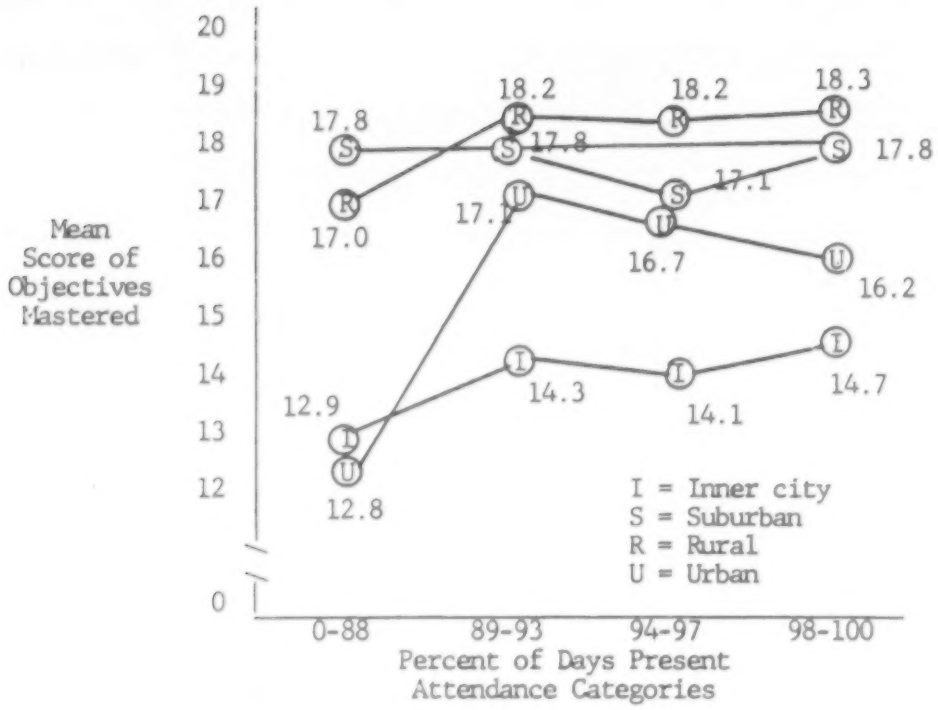

Figure 37

Analysis of Variance for Two-Way Interactions for READCOMP: Geographic Localities by Attendance

Basic Skills Word Identification Objectives

There were 2,426 students in the analysis. The study employed a 4x4x3x2x2 factorial design with class size (small, regular, and regular plus a full-time aide), sex (female, male), socioeconomic status (free/reduced lunch, non-free lunch), geographic localities (inner city, suburban, rural, urban), and attendance rates as the independent variables and the Basic Skills Word Identification Objectives (WORDID) composite as the dependent variable. As shown in Table 5, the

Table 5

Analysis of Variance: Summary: Word Identification (WORDID) #

Source of Variation		Sum of Squares	DF	Mean Square	F	Significance of F
Main Effects						
Class Type		2.21	2	1.11	0.84	0.430
Sex		22.04	1	22.04	16.83	0.000**
Socioeconomic Status (SES)		119.90	1	119.90	91.55	0.000**
Geographic Localities (GEOLO)		100.95	3	33.65	25.69	0.000**
Attendance		14.17	3	4.72	3.61	0.013*
2-Way Interactions						
Cl Type	Sex	15.20	2	7.60	5.80	0.003**
Cl Type	SES	8.11	2	4.06	3.10	0.045*
Cl Type	GEOLO	64.07	6	10.68	8.15	0.000**
Cl Type	Attend	6.48	6	1.08	0.82	0.551
Sex	SES	3.24	1	3.24	2.48	0.116
Sex	GEOLO	14.05	3	4.68	3.58	0.013*
Sex	Attend	16.65	3	5.55	4.24	0.005**
SES	GEOLO	28.32	3	9.44	7.21	0.000**
SES	Attend	4.45	3	1.48	1.13	0.334
GEOLO	Attend	20.33	9	2.26	1.73	0.078
Error		3112.97	2377	1.31		
Total		3651.62	2425	1.51		

WORDID = Composite score of the five items mastered.

* $p < .05$

** $p < .01$

2,837 cases processed; 411 missing cases

results of the analysis of variance of WORDID disclosed there was a significant difference among the main effects of sex (p = .000), socioeconomic status (p = .000), geographic localities (p = .000), and attendance (p = .013). There was statistically significant difference in the two-way interactions between the categories of: class type and sec (p = .003), class type and socioeconomic status (p = .045), class type and geographic localities (p = .000), sex and attendance (p = .005), sex and geographic localities (p = .013), and socioeconomic status and geographic localities (p = .000).

In the analysis of the main effects, as shown in Figure 38, the highest mean WORDID score for the small class was 4.44. The regular class plus a full-time aide obtained 4.43. The lowest mean WORDID score for the regular class was 4.38. Although all WORDID scores were similar, but not exact, the lowest mean WORDID score (4.38) was recorded in the regular

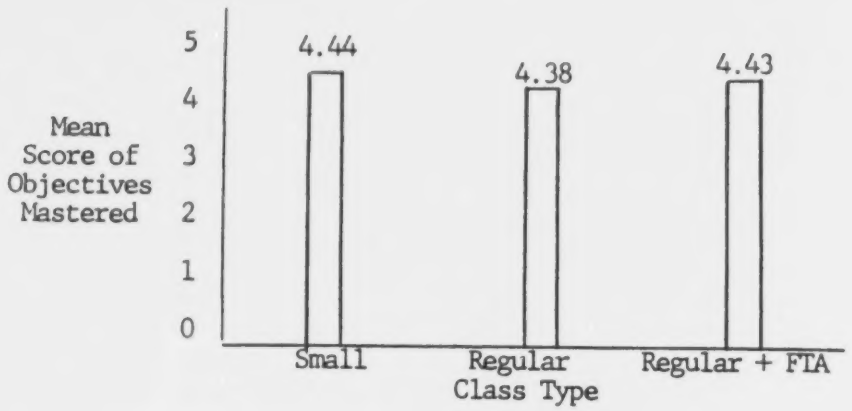

Figure 38

Analysis of Variance Main Effects:
WORDID by Class Type

class and the highest mean WORDID score (4.44) was recorded in the small class.

As shown in Figure 39, the mean WORDID score for females was 4.5 and 4.3 for males. On the 5 word identification objectives, females obtained a slightly higher mean WORDID score

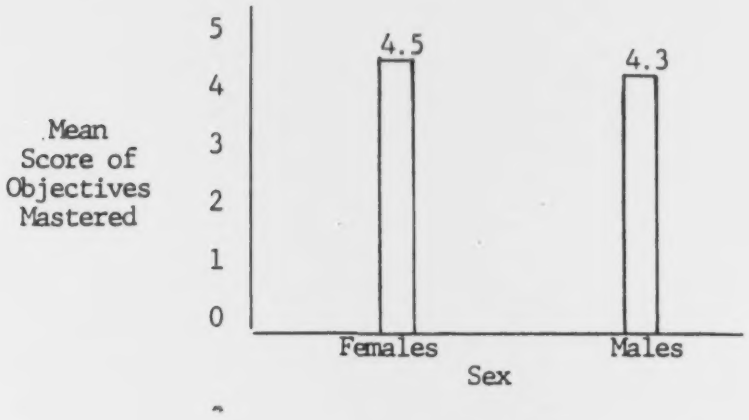

Figure 39

Analysis of Variance Main Effects:
WORDID by Sex

than males. Although this was a small gain, it was significant at .01.

In the WORDID analysis of variance, there were two categories for socioeconomic status (SES). The categories were free/reduced lunch and non-free lunch. There were 1,171 students in the free/reduced lunch category and 1,255 students in the non-free lunch category. As shown in Figure 40, the mean WORDID score for free/reduced lunch students was 4.1 and 4.7 for non-free lunch students. Non-free lunch

students obtained higher mean WORDID scores on the 5 word identification objectives tested. This was significant at the .01 level.

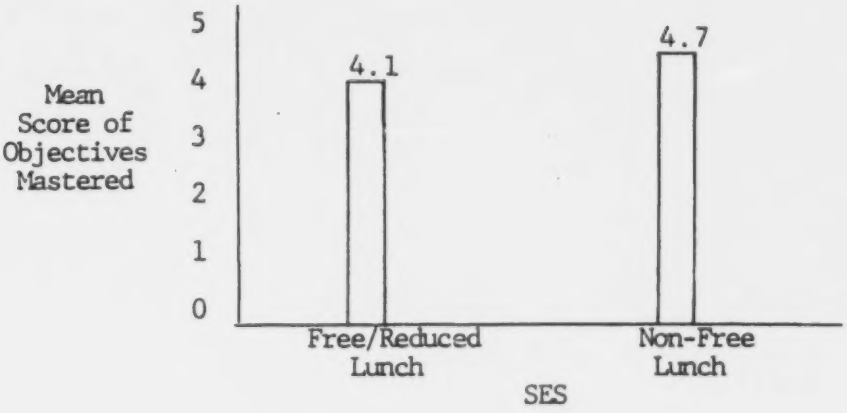

Figure 40

Analysis of Variance Main Effects: WORDID by Socioeconomic Status

In the analysis of WORDID by geographic localities, there were 316 students in the inner city group. The suburban group contained 273. There were 1,567 students in the rural group and 270 in the urban group.

As shown in Figure 41, the mean WORDID score for inner city students was 3.8, 4.7 for suburban students, 4.6 for rural students, and 4.0 for urban students. Of the four categories for geographic localities, the lowest mean score (3.8) was obtained by inner city students, and the highest mean score (4.7) was obtained by suburban students.

There were four attendance categories in the WORDID analysis of variance study. The first rate (0-88 percent present category) included 299 students. The second rate (89-93 percent present category) included 523 students. There were 809 students in the 94-97 percent present category, and 795 students in the 98-100 percent present category.

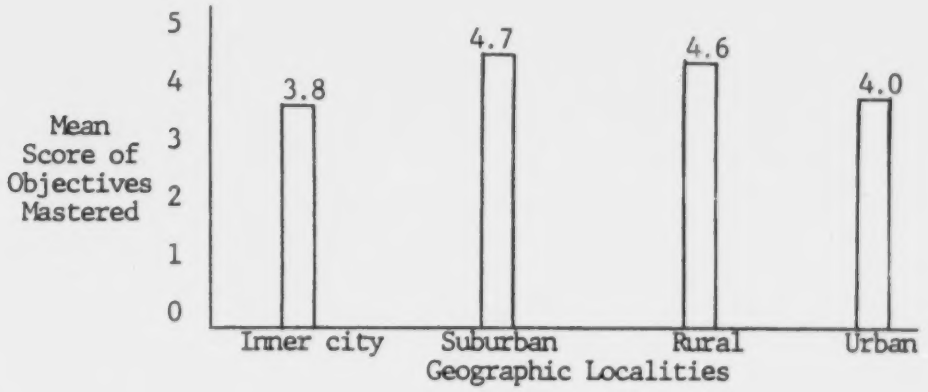

Figure 41

Analysis of Variance Main Effects: WORDID by Geographic Localities

As shown in Figure 42, the mean WORDID score by attendance rate was: 4.1 (0-88 percent present), 4.5 (89-93 percent present), 4.4 (94-97 percent present), and 4.5 (98-100 percent present). On the four attendance rates, the lowest mean WORDID score (4.1) was obtained by students in the 0-88 percent present category, and the highest mean WORDID score (4.5) was obtained in both the 89-93 percent present category and the 98-100 percent present category.

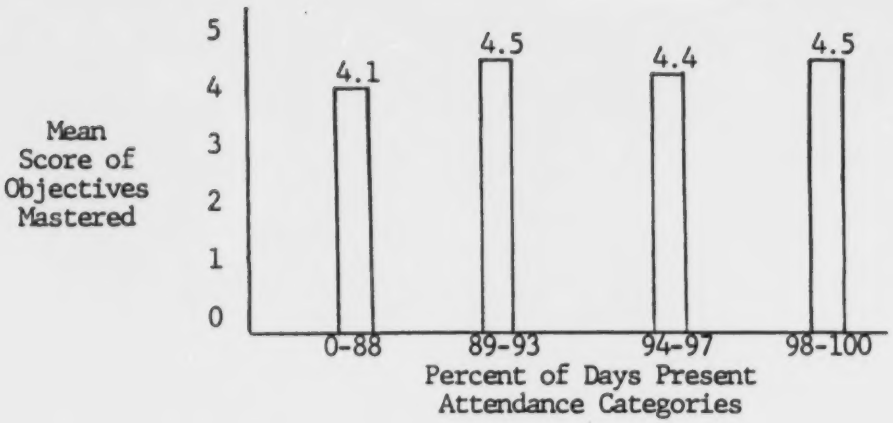

Figure 42

Analysis of Variance Main Effects:
WORDID by Attendance

In the presentation of the two-way interaction analysis, each two-way interaction is represented by a bar graph. When a significant difference was found, an interaction graph is also presented. In the two-way interactions for WORDID of class type by sex, there were 309 females and 313 males in the small class analysis. There were 474 females and 466 males in the regular class, and the regular class plus a full-time aide analysis contained 431 females and 433 males. As shown in Figure 43, the mean WORDID score for females in the small class was 4.51 and for males 4.36. Females in the regular class obtained a mean WORDID score of 4.58, and males obtained a mean score of 4.18. The mean WORDID score for females in the regular class plus a full-time aide was 4.42 and 4.43 for males. The lowest mean WORDID score (4.18) was recorded for males in the regular class. The highest

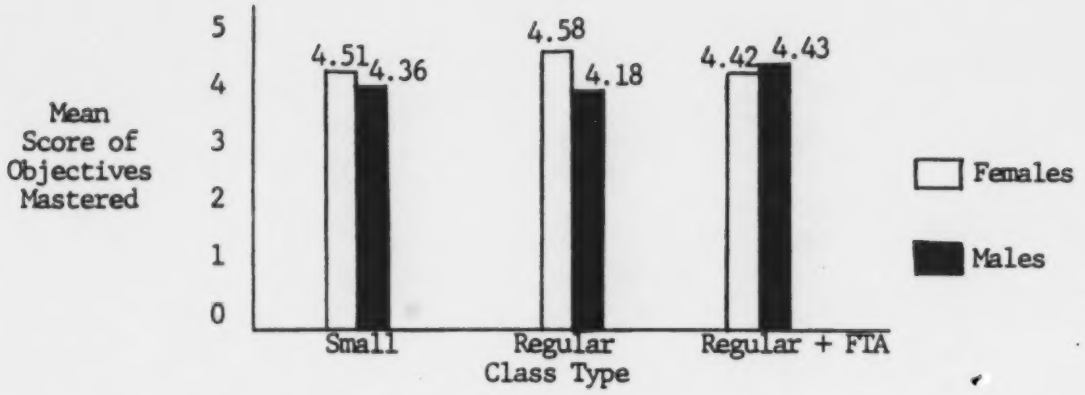

Figure 43

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Sex

mean WORDID score (4.58) was obtained by females in the regular class. In the three class types, males scored higher than females in only one class type (regular plus a full-time aide).

As shown in Figure 44, there was a statistically significant interaction at the .01 alpha level among the three class

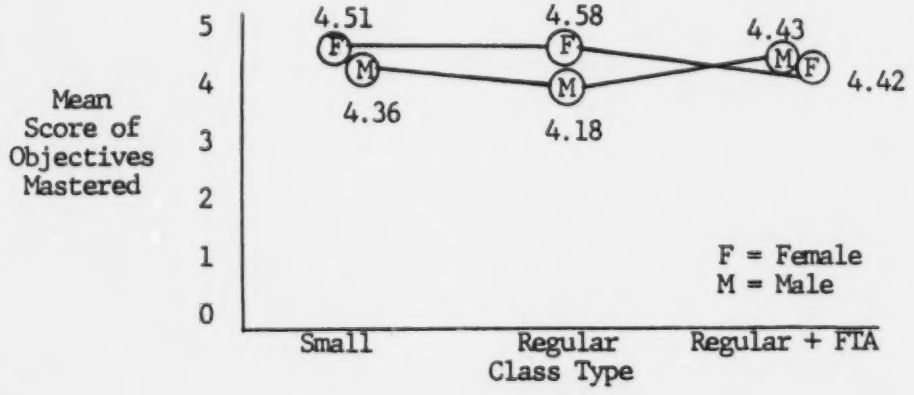

Figure 44

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Sex

types (small, regular, regular plus a full-time aide) and the two sex types ($F = 5.80$, $p = .003$).

In the analysis for WORDID of class size by socioeconomic status, there were 286 free/reduced lunch students and 336 non-free lunch students in the small class. There were 445 free/reduced lunch students and 495 non-free lunch students in the regular class. The regular class plus a full-time aide contained 440 free/reduced lunch students and 424 non-free lunch students. As shown in Figure 45, the mean WORDID score for free/reduced lunch students in the small class was 4.2 and 4.7 for non-free lunch students. The mean WORDID score for free/reduced lunch students in the regular class was 4.0 and 4.7 for non-free lunch students. Free/reduced lunch students in the regular class with a full-time aide

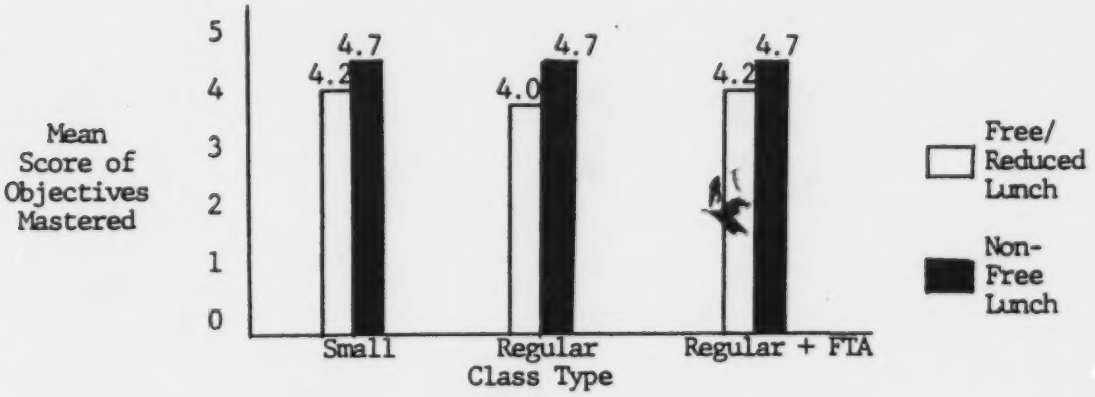

Figure 45

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Socioeconomic Status

obtained a mean WORDID score of 4.2 and non-free lunch students' mean WORDID score was 4.7. The lowest mean WORDID score (4.0) was recorded for free/reduced lunch students in the regular class. The highest mean WORDID scores (4.7) were obtained by non-free lunch students across all class types. Non-free lunch students in each class type scored higher than free/reduced lunch students in any category. Figure 46 displays a statistically significant interaction at the .05 alpha level among the three class types and the two socioeconomic status groups ($F = 3.10$, $p = .045$).

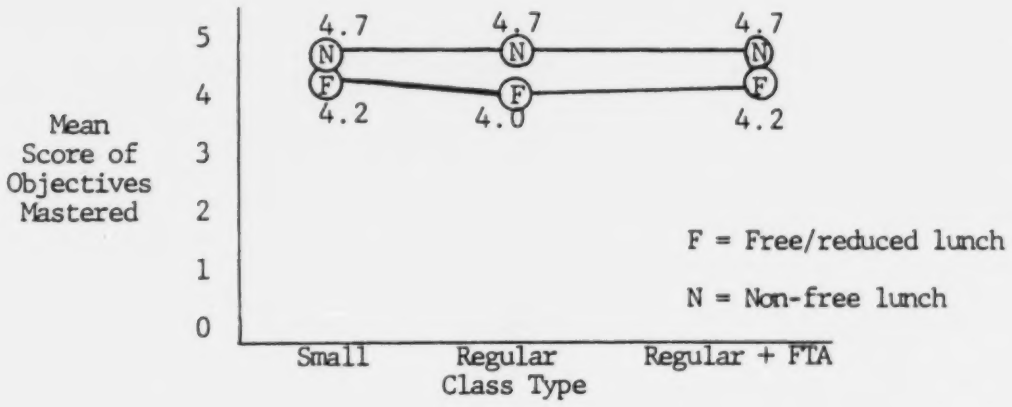

Figure 46

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Socioeconomic Status

In the analysis for WORDID of class type by geographic localities, there were 66 inner city, 54 suburban, 442 rural, and 60 urban students in the small class. There were 139 inner city, 88 suburban, 621 rural, and 92 urban students in

the regular class. There were 111 inner city, 131 suburban, 504 rural, and 118 urban students in the regular class plus a full-time aide.

As shown in Figure 47, the mean WORDID score for the small class for inner city students was 4.23, 4.96 for suburban students, 4.41 for rural students, and 4.35 for urban students. In the regular class the mean WORDID score was

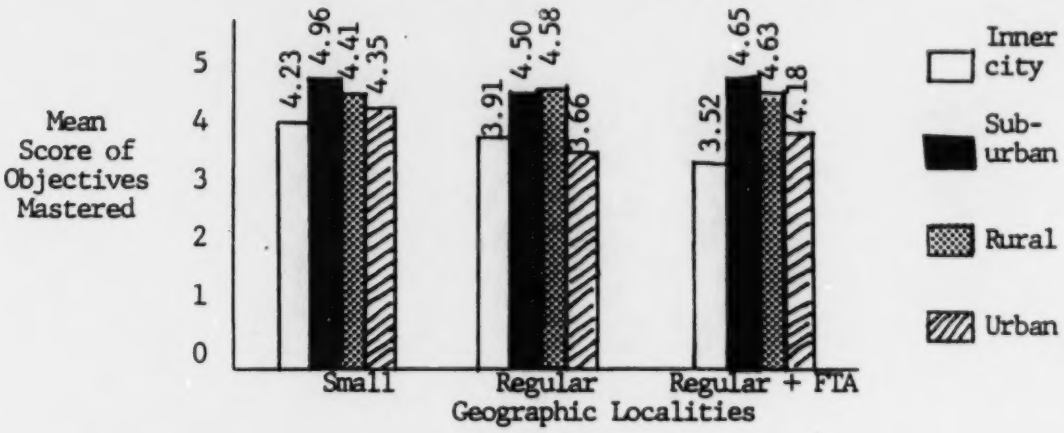

Figure 47

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Geographic Localities

3.91 for inner city students, 4.50 for suburban students, 4.58 for rural students, and 3.66 for urban students. The regular class plus a full-time aide's mean WORDID score for inner city students was 3.52, 4.65 for suburban students, 4.63 for rural students, and 4.18 for urban students. The lowest mean WORDID score (3.66) was obtained by urban students in a regular class. The highest mean WORDID score (4.96)

was obtained by suburban students in the small class type. As shown in Figure 48, there was a statistically significant interaction at the .01 alpha level among the three class types and the four geographic localities (F = 8.15, p = .000).

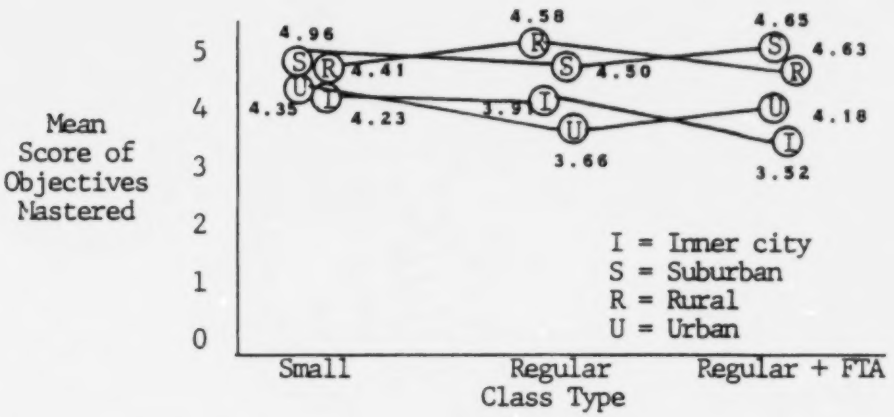

Figure 48

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Geographic Localities

In the analysis of WORDID of class type by attendance, there were 57 students in the first attendance category (0-88 percent present), 139 students in the 89-93 percent present category, 211 students in the 94-97 percent present category, and 215 students in the 98-100 percent present category in the small class. There were 119 students (0-88 percent present), 210 students (89-93 percent present category), 321 students (94-97 percent present), and 290

students (98-100 percent present) in the regular class. In the regular class plus a full-time aide, there were 123 students in the 0-88 percent present category; 174 students in the 89-93 percent present category; 277 students in the 94-97 percent present category; and 290 students in the 98-100 percent present category.

As shown in Figure 49, the mean WORDID score for the small class for the 0-88 percent present category was 3.86,

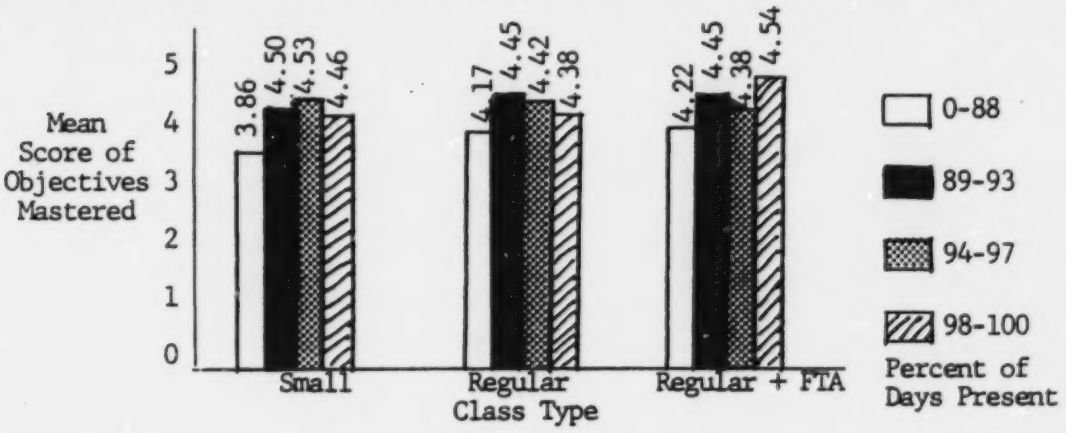

Figure 49

Analysis of Variance for Two-Way Interactions for WORDID: Class Type by Attendance

4.50 for the 89-93 percent present category, 4.53 for the 94-97 percent present category, and 4.46 for the 98-100 percent present category. In the regular class type, the mean WORDID score for the 0-88 percent present category was 4.17, 4.45 for the 89-93 percent present category, 4.42 for the 94-97 percent present category, and 4.38 for the 98-100 percent present category. For the regular class plus a full-time

aide, the mean WORDID score for the 0-88 percent present category was 4.22, 4.45 for the 89-93 percent present category, 4.38 for the 94-97 percent present category, and 4.54 for the 98-100 percent present category. The lowest mean WORDID score (3.86) was recorded in the small class in the 0-88 percent present category. The highest mean WORDID score (4.54) was obtained in the 98-100 percent attendance category in the regular class plus a full-time aide. In all of the class types, the students in the lowest attendance category (0-88 percent present) obtained lower mean WORDID scores.

In the analysis of WORDID by sex and socioeconomic status, there were 578 females in the free/reduced lunch category and 636 females in the non-free lunch category. There were 593 males in the free/reduced lunch category and 619 males in the non-free lunch category.

As shown in Figure 50, the mean WORDID score for females in the free/reduced lunch category was 4.2, and 4.8 for females in the non-free lunch category. The mean WORDID score for males in the free/reduced lunch category was 4.0 and 4.6 for males in the non-free lunch category. The lowest mean WORDID score (4.0) was obtained by males in the free/reduced lunch category. The highest mean WORDID score (4.8) was recorded for females in the non-free lunch category. Both females and males in the non-free lunch category obtained

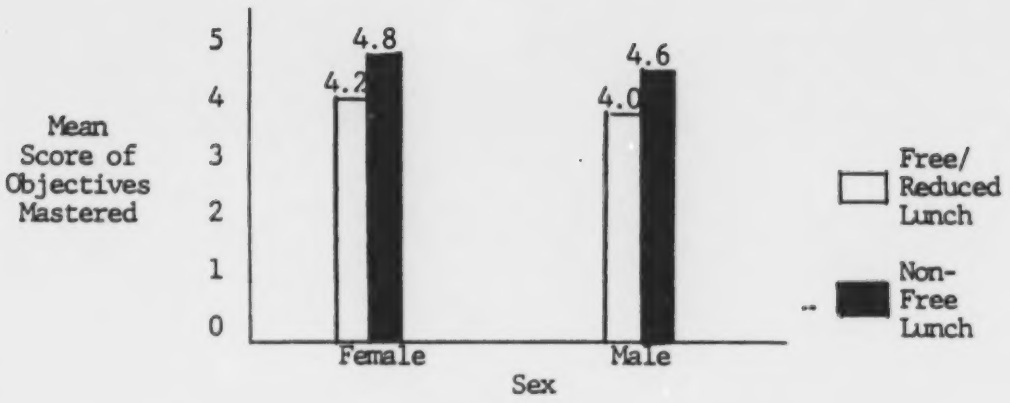

Figure 50

Analysis of Variance for Two-Way Interactions for WORDID: Sex by Socioeconomic Status

higher mean WORDID scores than females and males in the free/ reduced lunch category.

In the analysis of WORDID of sex by geographic localities, there were 168 females in the inner city, 142 females in the suburban, 769 females in the rural, and 135 females in the urban. There were 148 males in the inner city, 131 males in the suburban, 798 males in the rural, and 135 males in the urban. As shown in Figure 51, the mean WORDID score for females in the inner city geographic localities was 3.79 and 3.91 for males. The mean WORDID score for females in the suburban geographic localities was 4.73 and 4.59 for males. In the rural geographic localities, the mean WORDID score was 4.66 for females and 4.44 for males. The mean WORDID score for females in the urban geographic localities was 4.30 for females and 3.79 for males. The lowest mean WORDID score

Figure 50

Analysis of Variance for Two-Way Interactions for WORDID: Sex by Socioeconomic Status

higher mean WORDID scores than females and males in the free/ reduced lunch category.

In the analysis of WORDID of sex by geographic localities, there were 168 females in the inner city, 142 females in the suburban, 769 females in the rural, and 135 females in the urban. There were 148 males in the inner city, 131 males in the suburban, 798 males in the rural, and 135 males in the urban. As shown in Figure 51, the mean WORDID score for females in the inner city geographic localities was 3.79 and 3.91 for males. The mean WORDID score for females in the suburban geographic localities was 4.73 and 4.59 for males. In the rural geographic localities, the mean WORDID score was 4.66 for females and 4.44 for males. The mean WORDID score for females in the urban geographic localities was 4.30 for females and 3.79 for males. The lowest mean WORDID score

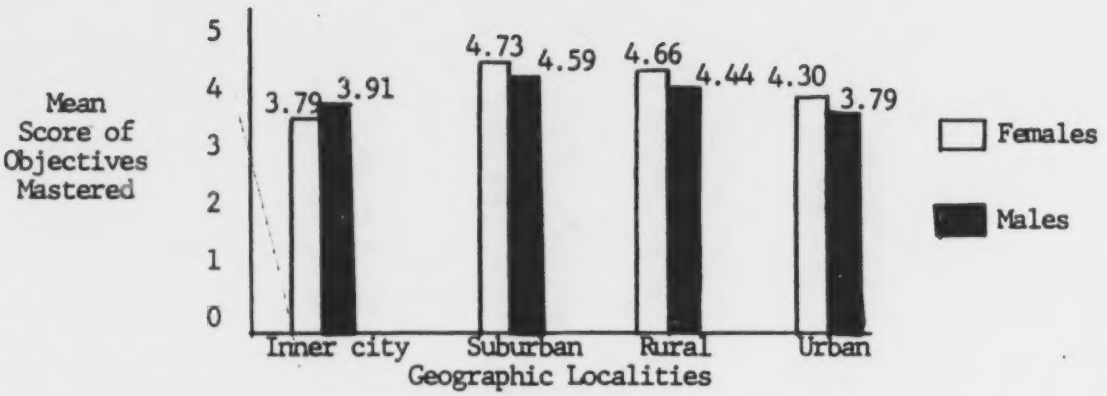

Figure 51

Analysis of Variance of Two-Way Interactions of WORDID: Sex by Geographic Localities

(3.79) was obtained by males in the inner city and urban geographic localities. The highest mean WORDID score (4.73) was recorded for females in the suburban geographic localities. Consistently higher scores were obtained by both females and males in suburban and rural schools as compared with mean WORDID scores of both females and males in the inner city and urban geographic localities. As shown in Figure 52, there was a statistically significant interaction at the .05 alpha level among the four geographic localities and the two sex types ($F = 3.58$, $p = .013$).

In the analysis of WORDID of sex by attendance, there were 156 females in the 0-88 percent present category, 247 females in the 89-93 percent present category, 421 females in the 94-97 percent present category, and 390 females in the 98-100 percent present category. There were 143 males in

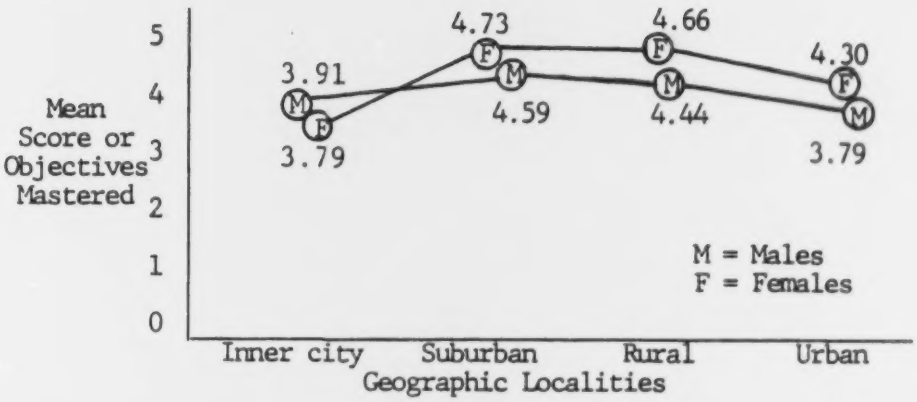

Figure 52

Analysis of Variance of Two-Way Interactions of WORDID: Sex by Geographic Localities

the 0-88 percent present category, 276 males in the 89-93 percent present category, 388 males in the 94-97 percent present category, and 405 males in the 98-100 percent present category.

As shown in Figure 53, females in the 0-88 percent present category obtained a mean WORDID score of 4.24, and males obtained a mean score of 4.01. In the 89-93 percent present category, the mean WORDID score for females was 4.49 and 4.44 for males. For the 94-97 percent present category, the mean WORDID score for females was 4.46 and 4.40 for males. In the 98-100 percent present category, females obtained a mean WORDID score of 4.67, while males' mean score was 4.26. The lowest mean WORDID score (4.01) was obtained by males in the 0-88 percent present category, while the highest mean

score (4.67) was obtained by females in the 98-100 percent present category.

As shown in Figure 54, there was a statistically significant interaction at .01 among the four attendance categories and the two sex types ($F = 4.24$, $p = .005$).

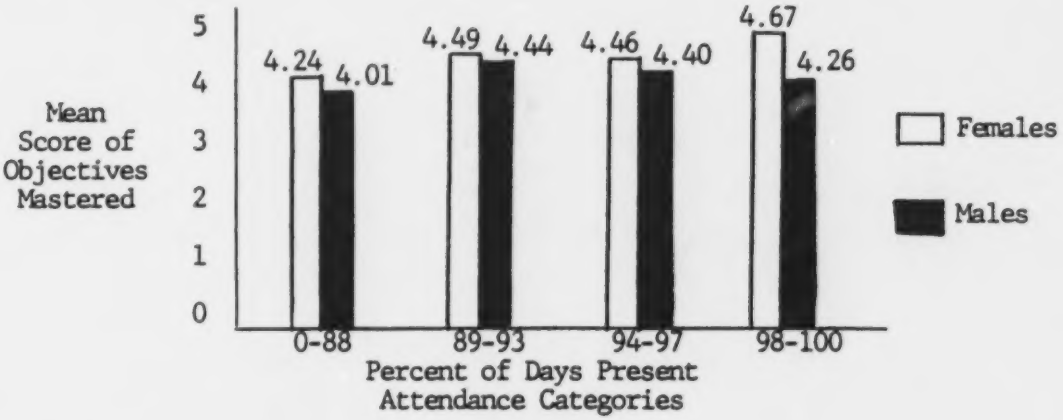

Figure 53

Analysis of Variance for Two-Way Interactions for WORDID: Sex by Attendance

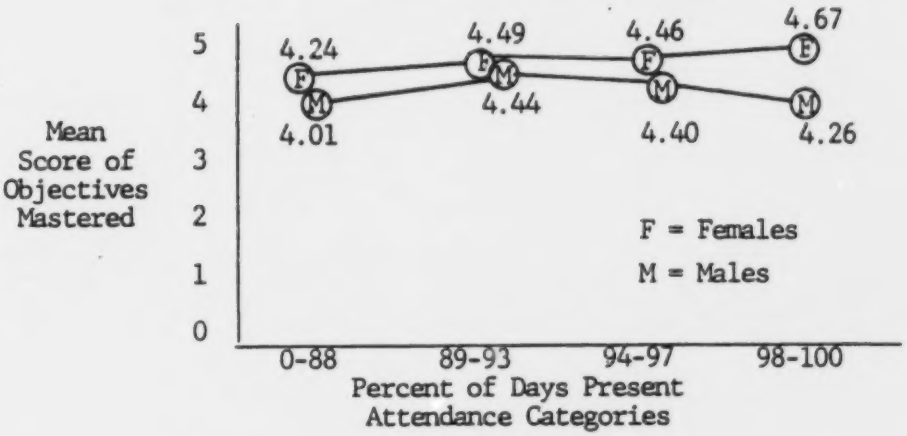

Figure 54

Analysis of Variance for Two-Way Interactions for WORDID: Sex by Attendance

In the analysis of WORDID of socioeconomic status by geographic localities, there were 290 free/reduced lunch inner city students; 107 free/reduced lunch suburban students; 647 free/reduced lunch rural students; and 127 free/reduced lunch urban students. There were 26 non-free lunch inner city students; 166 non-free lunch suburban students; 920 non-free lunch rural students; and 143 non-free lunch urban students.

As shown in Figure 55, the mean WORDID score for inner city students in the free/reduced lunch category was 3.76 and

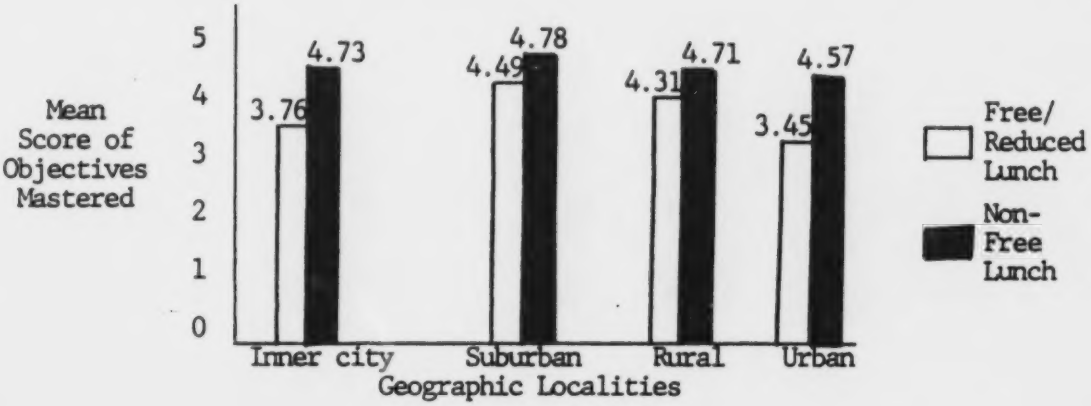

Figure 55

Analysis of Variance for Two-Way Interactions for WORDID: Socioeconomic Status by Geographic Localities

4.73 for non-free lunch students. The mean WORDID score for suburban students in the free/reduced lunch category was 4.49 and 4.78 for non-free lunch students. In the rural geographic localities, the mean WORDID score for free/reduced lunch

students was 4.31 and 4.71 for non-free lunch students. In the urban geographic localities the mean WORDID scores were 3.45 for free/reduced lunch students and 4.57 for non-free lunch students. The lowest mean WORDID score (3.45) was recorded for urban students in the free/reduced lunch category. The highest mean WORDID score (4.78) was obtained by suburban students in the non-free lunch category. Mean WORDID scores were lower for free/reduced lunch students in all geographic localities as compared with non-free lunch students.

As shown in Figure 56, there was a statistically significant interaction at the .01 alpha level among the four geographic localities and the two socioeconomic status groups ($F = 7.21$, $p = .000$).

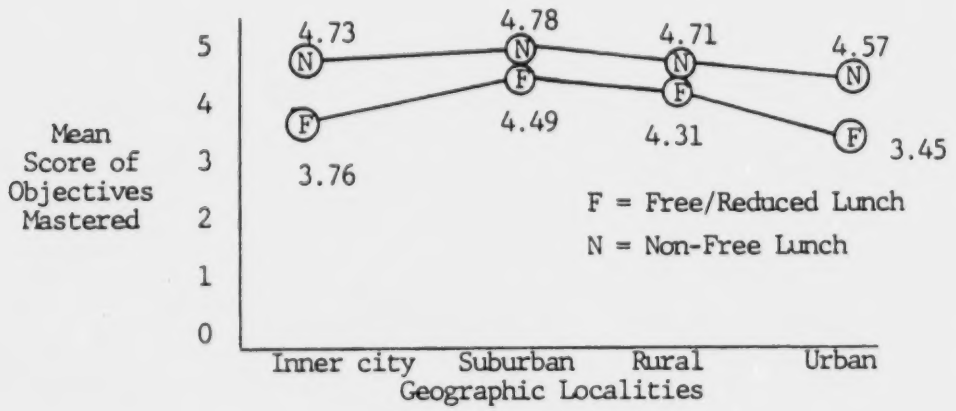

Figure 56

Analysis of Variance for Two-Way Interactions for WORDID: Socioeconomic Status by Geographic Localities

In the analysis of WORDID of socioeconomic status by attendance, there were 191 free/reduced lunch students in the 0-88 percent present category, 249 free/reduced lunch students in the 89-93 percent present category, 379 free/reduced lunch students in the 94-97 percent present category, and 352 free/reduced lunch students in the 98-100 percent present category. There were 108 non-free lunch students in the 0-88 percent present category, 274 non-free lunch students in the 89-93 percent present category, 430 non-free lunch students in the 94-97 percent present category, and 443 non-free lunch students in the 98-100 percent present category.

As shown in Figure 57, the mean WORDID scores in the 0-88 percent present category were 3.86 for free/reduced lunch students and 4.60 for non-free lunch students. In the 89-93 percent present category, the mean WORDID scores were

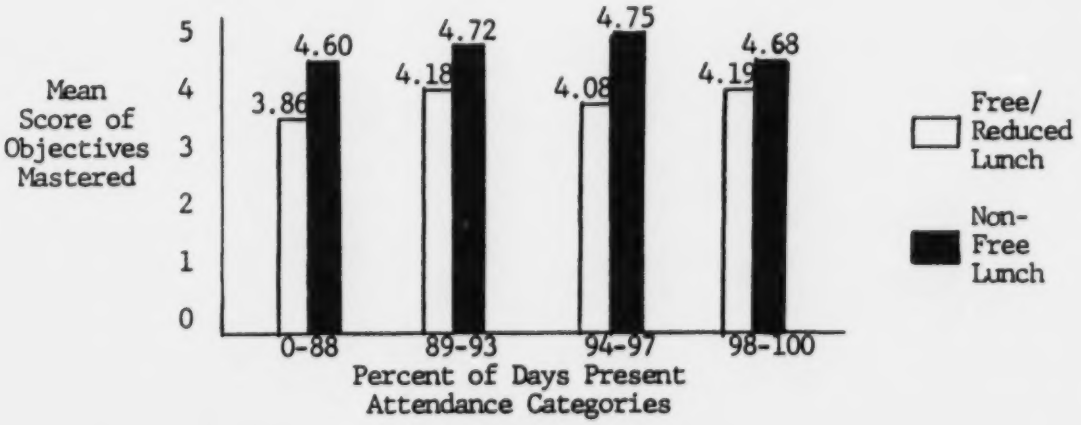

Figure 57

Analysis of Variance for Two-Way Interactions for WORDID: Socioeconomic Status by Attendance

4.18 for free/reduced lunch students and 4.72 for non-free lunch students. For the 94-97 percent present category, the mean WORDID scores were 4.08 for free/reduced lunch students and 4.75 for non-free lunch students. In the 98-100 percent present category, the mean WORDID scores were 4.19 for free/reduced lunch students and 4.68 for non-free lunch students. The lowest mean WORDID score (3.86) was obtained by free/reduced lunch students in the 0-88 percent present category. The highest WORDID score (4.75) was recorded for non-free lunch students in the 94-97 percent present rate. Free/reduced lunch students obtained lower mean WORDID scores in every attendance category than the non-free lunch students.

In the analysis of WORDID of geographic localities by attendance, there were 40 inner city students in the 0-88 percent present category, 64 inner city students in the 89-93 percent present category, 83 inner city students in the 94-97 percent present category, and 129 inner city students in the 98-100 percent present category. For the suburban geographic localities, there were 22 students in the 0-88 percent present category, 51 students in the 89-93 percent present category, 82 students in the 94-97 percent present category, and 118 students in the 98-100 percent present category. For the rural geographic localities, there were 199 students in the 0-88 percent present category, 356

students in the 89-93 percent present category, 546 students in the 94-97 percent present category, and 466 students in the 98-100 percent present category. For the urban geographic localities there were 38 students in the 0-88 percent present category, 52 students in the 89-93 percent present category, 98 students in the 94-97 percent present category, and 82 students in the 98-100 percent present category.

As shown in Figure 58, the mean WORDID scores for the 0-88 percent present category were 3.70 for inner city

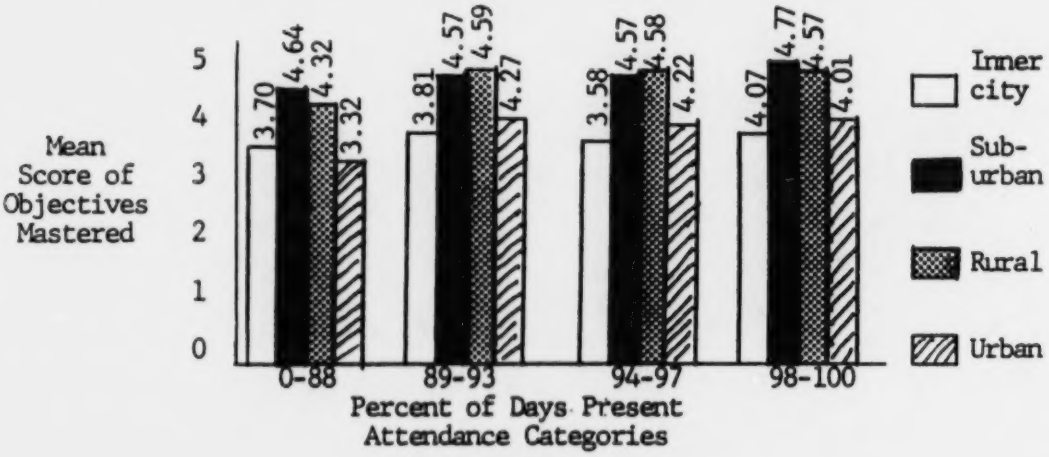

Figure 58

Analysis of Variance for Two-Way Interactions for WORDID: Geographic Localities by Attendance

students, 4.64 for suburban students, 4.32 for rural students, and 3.32 for urban students. The mean WORDID scores for the 89-93 percent present category were: 3.81 for inner city, 4.57 for suburban students, 4.59 for rural students, and 4.27

for urban students. The mean WORDID scores for the 94-97 percent present category were: 3.58 for inner city students, 4.57 for suburban students, 4.58 for rural students, and 4.22 for urban students. The mean WORDID scores for the 98-100 percent present category were 4.07 for inner city students, 4.77 for suburban students, 4.57 for rural students, and 4.01 for urban students. The lowest mean WORDID score (3.32) was obtained by urban students in the 0-88 percent present category. The highest mean WORDID score (4.77) was obtained by suburban students in the 98-100 percent present category.

Crosstabulation Analyses

The composite scores on the 25 reading readiness objectives (MASTERY) of the three class types were compared. The objectives mastered were divided into three categories: 0-16, 17-22, and 23-25. As shown in Table 6, 491 (67.7 percent) of the 725 students in the small class type mastered between 23 and 25 objectives. Of the 1,074 students in the regular class type, 620 (57.7 percent) mastered the same category, while 602 (60.2 percent) of the 1,000 students in the regular class plus a full-time aide mastered this category. The patterns of percentage in the categories of objectives mastered were different for the three class types. The small class had a higher percentage of its student population in the high category of objectives mastered. There

Table 6

Crosstabulation Analysis: MASTERY by Class Type

Class Type	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
Small	110 15.2%	124 17.1%	491 67.7%	725
Regular	188 17.5%	266 24.8%	620 57.7%	1,074
Regular + FTA	167 16.7%	231 23.1%	602 60.2%	1,000
Column Total	465	621	1,713	2,799

Chi square = 20.789 df = 4 p = .0003

was a significant difference in the pattern of percentages for the three class types, with the small class having a higher percentage of students in the high mastery group. The chi square of 20.789 with 4 degrees of freedom was significant at p = .002. This was statistically significant at the .01 alpha level.

The composite scores on the 20 reading readiness objectives (READCOMP) of the three class types were compared. The objectives mastered were divided into three categories: 0-14, 15-18, and 19-20. As shown in Table 7, 461 (63.6 percent) of the 725 students in the small class type mastered 19 or 20 objectives. Of the 1,074 students in the regular class type, 578 (53.8 percent) fell in the same

Table 7

Crosstabulation Analysis: READCOMP by Class Type

Class Type	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
Small	129 17.8%	135 18.6%	461 63.6%	725
Regular	258 24.0%	238 22.2%	578 53.8%	1,074
Regular + FTA	215 21.5%	228 22.8%	557 55.7%	1,000
Column Total	602	601	1,596	2,799

Chi square = 19.331 df = 4 p = .007

category, while 557 (55.7 percent) of the 1,000 students in the regular class plus a full-time aide mastered this category. The patterns of percentages in the categories of objectives mastered were different for the three class types. The small class had the highest percentage of its students in the high category of objectives mastered. There was a significant difference in the pattern of percentages for the three class types, with the small class type having the highest percentage of students in the high mastery group. The chi square of 19.331 with 4 degrees of freedom was significant at $p = .007$. This was statistically significant at the .01 alpha level.

The composite scores on the five word identification reading readiness objectives were compared. The number of objectives mastered were divided into three categories: 0-1, 2-3, and 4-5. As shown in Table 8, 611 (84.3 percent) of the 725 students in the small class type mastered 4 or 5 objectives. Of the 1,074 students in the regular class

Table 8

Crosstabulation Analysis: WORDID by Class Type

Class Type	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
Small	56 7.7%	58 8.0%	611 84.3%	725
Regular	80 7.4%	92 8.6%	902 84.0%	1,074
Regular + FTA	79 7.9%	107 10.7%	814 81.4%	1,000
Column Total	215	257	2,327	2,799

Chi square = 4.765 df = 4 p = 0.3123

type, 902 (84.0 percent) mastered the highest category, while 814 (81.4 percent) of the 1,000 students in the regular class plus a full-time aide mastered 4 or 5 objectives. Although the small class had a higher percentage of its student population in the category of high objectives mastered, the variations in WORDID between class size was not as great

as in MASTERY and READCOMP. There was not a significant difference in the patterns of percentages for the three class types. The chi square of 4.765 with 4 degrees of freedom and $p = 0.3123$ was not significant at the .05 alpha level.

The composite scores (MASTERY) from the four geographic localities were compared. As shown in Table 9, 155 (37.9 percent) of the 409 inner city students mastered between 23 and 25 objectives. Two hundred and one (59.6 percent) of the 337 suburban students mastered the highest category, while 1,195 students (67.5 percent) of the 1,770 students in the rural area mastered between 23 and 25 objectives.

Table 9

Crosstabulation Analysis: MASTERY by Geographic Localities

Geographic Localities	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
Inner city	129 31.5%	125 30.6%	155 37.9%	409
Suburban	42 12.5%	94 27.9%	201 59.6%	337
Rural	206 11.6%	369 20.8%	1,195 67.5%	1,770
Urban	92 28.7%	54 16.8%	175 54.5%	321
Column Total	469	642	1,726	2,837

Chi square = 186.607 df = 6 $p = 0.0000$

One hundred and seventy-five (54.5 percent) of the 321 students in the urban area mastered between 23 and 25 objectives. The patterns of percentages in the categories of objectives mastered were different for the four geographic localities. The rural geographic localities had a higher percentage of the students in the high category of objectives mastered, while the inner city localities had the highest percentage of students in the category of low mastery. There was a significant difference in the pattern of percentages for the four geographic localities, with the rural geographic localities having a higher percentage of students in the high mastery group. The chi square of 186.607 with 6 degrees of freedom was significant at $p = .0000$. This was statistically significant at the .01 alpha level.

The composite scores (READCOMP) from the four geographic localities were compared. As shown in Table 10, 153 (37.4 percent) of the 409 inner city students mastered 19 or 20 objectives. One hundred and seventy-five (51.9 percent) of the 337 suburban students mastered the highest category, while 1,117 (63.1 percent) of the 1,770 students in rural areas mastered 19 or 20 objectives. One hundred and sixty-three of the 321 students in the urban area mastered the highest category. The patterns of percentages in the categories of objectives were different for the four geographic localities. The rural geographic localities had the highest

Table 10

Crosstabulation Analysis: READCOMP by Geographic Localities

Geographic Localities	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
Inner city	171 41.8%	85 20.8%	153 37.4%	409
Suburban	59 17.5%	103 30.6%	175 51.9%	337
Rural	276 15.6%	377 21.3%	1,117 63.1%	1,770
Urban	101 31.5%	57 17.8%	163 50.8%	321
Column Totals	607	622	1,608	2,837

Chi square = 182.911 df = 6 p = .0000

percentage of its student population in the high category of objectives mastered. There was a significant difference in the pattern of percentages for the four geographic localities, with the rural geographic localities having a higher percentage of students in the high mastery group. The chi square of 182.911 with 6 degrees of freedom was significant at $p = .0000$. This was statistically significant at the .01 alpha level.

The composite scores (WORDID) from the four geographic localities were compared. As shown in Table 11, 300 (73.3 percent) of the 409 inner city students mastered 4 or 5 of

Table 11

Crosstabulation Analysis: WORDID by Geographic Localities

Geographic Localities	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
Inner city	52 12.7%	57 13.9%	300 73.3%	409
Suburban	18 5.3%	16 4.7%	303 89.9%	337
Rural	86 4.9%	165 9.3%	1,519 85.8%	1,770
Urban	59 18.4%	21 6.5%	241 75.1%	321
Column Totals	215	259	2,363	2,837

Chi square = 113.603 df = 6 p = 0.0000

the word identification skills. Three hundred and three (89.9 percent) of the 337 suburban students mastered 4 or 5 of the WORDID objectives. One thousand five hundred and nineteen (85.8 percent) of the 1,770 students in the rural areas mastered the highest category. Two hundred forty-one (75.1 percent) of 321 urban students mastered 4 or 5 objectives. The patterns of percentages in the categories of objectives mastered were different for the four geographic localities. The suburban localities had a higher percentage of its student population in the high category of objectives mastered. There was a significant difference in the pattern

of percentages for the four class type groups, with the suburban geographic locality having a higher percentage of students in the high mastery group. The chi square of 113.603 with 6 degrees of freedom was significant at $p = .0000$. This was statistically significant at the .01 alpha level.

The composite scores (MASTERY) from the three races were compared. As shown in Table 12, 1,283 (70.1 percent) of the

Table 12

Crosstabulation Analysis: MASTERY by Race

Race	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
White	174 9.5%	374 20.4%	1,283 70.1%	1,831
Black	147 25.4%	164 28.4%	267 46.2%	578
Other	4 23.5%	2 11.8%	11 64.7%	17
Column Totals	325	540	1,561	2,426

Chi square = 136.765 $df = 4$ $p = .0000$

1,831 white students mastered between 23 and 25 objectives. Two hundred and sixty-seven (46.2 percent) of the 578 black students mastered the highest category. Eleven (64.7 percent) of the 17 students in the classification for other mastered between 23 and 25 objectives. The patterns of percentages

in the categories of objectives mastered were different for the three race types. There was a higher percentage of white students in the high category of objectives mastered. There was a significant difference in the pattern of percentages for the three race types, with the white race having a higher percentage of students in the high mastery group. The chi square of 136.765 with 4 degrees of freedom was significant at $p = .0000$. This was statistically significant at the .05 alpha level.

The composite scores (READCOMP) for the three races were compared. As shown in Table 13, 1,190 (65.0 percent)

Table 13

Crosstabulation Analysis: READCOMP by Race

Race	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
White	240 13.1%	401 21.9%	1,190 65.0%	1,831
Black	201 34.8%	125 21.6%	252 43.6%	578
Other	4 23.5%	4 23.5%	9 52.9%	17
Column Totals	445	530	1,451	2,426

Chi square = 146.482 $df = 4$ $p = .0000$

of the 1,831 white students in the analysis mastered 19 or 20 objectives. Two hundred fifty-two (43.6 percent) of the

578 black students mastered the highest category. Nine (52.9 percent) of the 17 students in the category for other races mastered 19 or 20 objectives. The patterns of percentages in the categories of objectives mastered were different for the three class types. The white student category contained the highest percentage of its population in the high category of objectives mastered. There was a significant difference in the pattern of percentages for the three race types, with white students having a higher percentage of students in the high mastery group. The chi square of 146.482 with 4 degrees of freedom was significant at p = .0000. This was statistically significant at the .05 alpha level.

The composite scores on the five word identification reading readiness objectives (WORDID) of the three race types were compared. As shown in Table 14, 1,629 (89.0 percent) of the 1,831 white students mastered 4 or 5 objectives. Four hundred and forty-nine (77.7 percent) of the 578 black students mastered the highest category. Fifteen (88.2 percent) of the 17 students in the other race category mastered 4 or 5 objectives. The patterns of percentages in the categories mastered were different for the three race types. The white student category had a higher percentage of its student population in the high category of objectives mastered. There was a significant difference in the pattern

of percentages for the three race categories, with the white student category having a higher percentage of students in the high mastery group. The chi square of 59.359 with 4 degrees of freedom was significant at p = .0000. This was statistically significant at the .05 alpha level.

Table 14

Crosstabulation Analysis: WORDID by Race

Race	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
White	65 3.5%	137 7.5%	1,629 89.0%	1,831
Black	63 10.9%	66 11.4%	449 77.7%	578
Other	1 5.9%	1 5.9%	15 88.2%	17
Column Totals	129	204	2,093	2,426
Chi square = 59.359		df = 4		p = .0000

The composite scores of the 25 reading readiness objectives (MASTERY) of the four attendance categories were compated. As shown in Table 15, 162 (54.2 percent) of the 299 students in the 0-88 percent present attendance category mastered between 23 and 25 objectives. In the 89-93 percent present category, 345 (66.0 percent) of the 523 students mastered between 23 and 25 objectives. Five hundred and thirty-three

(65.9 percent) of the 809 students in the 94-97 percent present category mastered between 23 and 25 objectives.

Table 15

Crosstabulation Analysis: MASTERY by Attendance

Attendance Categories	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
0-88% present	68 22.7%	69 23.1%	162 54.2%	299
89-93% present	58 11.1%	120 22.9%	345 66.0%	523
94-97% present	100 12.4%	176 21.8%	533 65.9%	809
98-100% present	99 12.5%	175 22.0%	521 65.5%	795
Column Totals	325	540	1,561	2,426

Chi square = 28.496 df = 6 p = 0.001

Five hundred and twenty-one (65.5 percent) of the 795 students in the 98-100 percent present category mastered the highest category of objectives. The patterns of percentages in the categories of objectives mastered were fairly consistent over the three highest attendance categories. The differences in the pattern of percentages were observed in the 0-88 percent categories. Although there was a lower percentage of students in the high mastery group, there was also a higher percentage of students in the low mastery group as compared

with other attendance categories. The chi square of 28.496 with 4 degrees of freedom was statistically significant at the .01 alpha level.

The composite scores on the 20 reading readiness comprehension objectives of the four attendance categories were compared. As shown in Table 16, 150 (50.2 percent) of 299 students in the 0-88 percent present attendance category mastered 19 or 20 objectives. Three hundred and twenty-two (61.6 percent) of the 523 students in the 89-93 percent category mastered the highest category of objectives. Four hundred and ninety-four (61.1 percent) of the 809 students in the 94-97 percent present category mastered the highest category.

Table 16

Crosstabulation Analysis: READCOMP by Attendance

Attendance Categories	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
0-88% present	86 28.8%	63 21.1%	150 50.2%	299
89-93% present	87 16.6%	114 21.8%	322 61.6%	523
94-97% present	135 16.7%	180 22.2%	494 61.1%	809
98-100% present	137 17.2%	173 21.8%	485 61.0%	795
Column Totals	445	530	1,451	2,426
Chi square = 25.394		df = 6		p = 0.0002

Four hundred eighty-five (61.0 percent) of the 795 students in the highest attendance category mastered 19 or 20 objectives. As discussed in Table 16, there were consistent and similar patterns of percentages within the top three attendance categories. In the lowest attendance category (0-88 percent present), there was a smaller percentage of students in the high objectives mastered category, as compared with the other attendance categories. The chi square of 25.394 with 6 degrees of freedom was significant at $p = .0002$. This was statistically significant at the .01 alpha level.

The composite scores on the five word identification reading readiness objectives (WORDID) of the attendance categories were compared. As shown in Table 17, 235 (78.6 percent) of 299 students in the 0-88 percent present category mastered the highest category of objectives. Four hundred and fifty-four (86.8 percent) of the 523 students in the 89-93 percent present category mastered 4 or 5 objectives. Seven hundred and five (87.1 percent) of the 809 students in the 94-97 percent present category mastered 4 or 5 objectives, and 699 (87.9 percent) of the 795 students in the 98-100 percent present category mastered 4 or 5 objectives. The patterns of percentages in the categories of objectives mastered were different for the attendance categories. The lowest attendance rate had the lowest percentage of students in the high mastery group, and the highest percentage of students in

Table 17

Crosstabulation Analysis: WORDID by Attendance

Attendance Categories	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
0-88% present	25 8.4%	39 13.0%	235 78.6%	299
89-93% present	19 3.6%	50 9.6%	454 86.8%	523
94-97% present	43 5.3%	61 7.5%	705 87.1%	809
98-100% present	42 5.3%	54 6.8%	699 87.9%	795
Column Totals	129	204	2,093	2,426

Chi square = 22.435 df = 6 p = 0.0012

the low mastery group. The chi square of 22.435 with 6 degrees of freedom was significant at $p = .0012$. This was statistically significant at the .01 alpha level.

The composite scores on the 25 reading readiness objecgives (MASTERY) of the two socioeconomic status groups were compared. As shown in Table 18, 591 (50.5 percent) of the 1,171 students in the free/reduced lunch category mastered between 23 and 25 objectives. Nine hundred and seventy (77.3 percent) of the 1,255 students in the non-free lunch category mastered the highest category of objectives. The non-free lunch students had the highest percentage of its student

Table 18

Crosstabulation Analysis: MASTERY by Socioeconomic Status

Socioeconomic Status	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
Free/reduced lunch	263 22.5%	317 27.1%	591 50.5%	1,171
Non-free lunch	62 4.9%	223 17.8%	970 77.3%	1,255
Column Totals	325	540	1,561	2,426

Chi square = 230.596 df = 2 p = 0.0000

population in the highest category of objectives mastered. There was a higher percentage of the free/reduced lunch students in the category of low objectives mastered. The patterns of percentages in the categories of objectives mastered were different for the two socioeconomic status groups. There was a significant difference in the pattern of percentages for the two socioeconomic status categories, with the non-free lunch group having a higher percentage of students in the high mastery group. The chi square of 230.596 with 2 degrees of freedom was statistically significant at the .01 alpha level.

The composite scores on the 20 reading readiness objectives (READCOMP) of the two socioeconomic status groups were compared. As shown in Table 19, 551 (47.1 percent) of the

Table 19

Crosstabulation Analysis: READCOMP by Socioeconomic Status

Socioeconomic Status	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
Free/reduced lunch	333 28.4%	287 24.5%	551 47.1%	1,171
Non-free lunch	112 8.9%	243 19.4%	900 71.1%	1,255
Column Totals	445	530	1,451	2,426

Chi square = 194.756 df = 2 p = 0.0000

1,171 free lunch students mastered 19 or 20 objectives. There were 900 (71.7 percent) of 1,255 students in the non-free lunch category who mastered 19 or 20 objectives. There was a higher percentage of non-free lunch students in the category of high objectives mastered. There was a higher percentage of free/reduced lunch students in the low mastery group as compared with the percentage of non-free lunch students in that category. The patterns of percentages in the categories of objectives mastered were different for the two socioeconomic status categories. There was a significant difference in the pattern of percentages for the two socioeconomic categories, with the non-free lunch group having a higher percentage of students in the high mastery group. The chi square of 194.756 with 2 degrees of freedom was

significant at $p = .0000$. This was statistically significant at the .01 alpha level.

The composite scores of the 5 word identification objectives (WORDID) of the two socioeconomic status groups were compared. As shown in Table 20, 919 (78.5 percent) of the 1,171 students in the free/reduced lunch category mastered 4 or 5 objectives. One thousand one hundred and seventy-four

Table 20

Crosstabulation Analysis: WORDID by Socioeconomic Status

Socioeconomic Status	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
Free/reduced lunch	105 9.0%	147 12.6%	919 78.5%	1,171
Non-free lunch	24 1.9%	57 4.5%	1,174 93.5%	1,255
Column Totals	129	204	2,093	2,426
Chi square = 118.682		$df = 2$		$p = 0.0000$

(93.5 percent) of the 1,255 students in the non-free lunch category mastered the highest category of objectives. The patterns of percentages in the categories of objectives mastered were different for the two socioeconomic status groups. The non-free lunch category had the highest percentage of its student population in the high category of

objectives mastered. The free/reduced lunch category had a higher percentage of its student population in the category of low objectives mastered. There was a significant difference in the pattern of percentages for the two socioeconomic status groups, with the non-free lunch category having a higher percentage of its students in the high mastery group. The chi square of 118.682 with 2 degrees of freedom was significant at $p = .0000$. This was statistically significant at the .01 alpha level.

The composite scores on the 25 reading readiness objectives (MASTERY) of the two sex types were compared. As shown in Table 21, 827 (68.1 percent) of the 1,214 females mastered

Table 21

Crosstabulation Analysis: MASTERY by Sex

Sex	Number of Objectives Mastered 0-16 Low	17-22 Middle	23-25 High	Row Totals
Female	138 11.4%	249 20.5%	827 68.1%	1,214
Male	187 15.4%	291 24.0%	734 60.6%	1,212
Column Totals	325	540	1,561	2,426
Chi square = 16.934		df = 2		p = 0.0003

between 23 and 25 objectives. Seven hundred and thirty-four (60.6 percent) of the 1,212 males mastered the highest

category of objectives. In the category of low objectives mastered, the male students had a higher percentage of students represented as compared with the percentage of female students. The patterns of percentages in the categories of objectives mastered were different for the two sex types. There was a significant difference in the pattern of percentages for the two sex types, with females having a higher percentage of students in the high mastery group. The chi square of 16.934 with 2 degrees of freedom was significant at p = .0003. This was statistically significant at the .01 alpha level.

The composite scores on the 20 reading readiness objectives (READCOMP) of the two sex types were compared. As shown in Table 22, 767 (63.2 percent) of the 1,214 females mastered

Table 22

Crosstabulation Analysis: READCOMP by Sex

Sex	Number of Objectives Mastered 0-14 Low	15-18 Middle	19-20 High	Row Totals
Female	208 17.1%	239 19.7%	767 63.2%	1,214
Male	237 19.6%	291 24.0%	684 56.4%	1,212
Column Totals	445	530	1,451	2,426

Chi square = 11.738 df = 2 p = 0.0028

19 or 20 objectives. Six hundred and eighty-four (56.4 percent) of the 1,212 males in the analysis mastered the highest category of objectives. Comparatively, females had a higher percentage of their student population in the high mastery category than males. There was a higher percentage of males in the low mastery group. The patterns of percentages in the categories of objectives mastered were different for the two class types. There was a significant difference in the pattern of percentages for the two sex types, with females having a higher percentage of students in the high mastery group. The chi square of 11.738 with 2 degrees of freedom was significant at $p = .0028$. This was statistically significant at the .01 alpha level.

The composite scores of the 5 word identification objectives (WORDID) of the two sex types were compared. As shown in Table 23, 1,075 (88.6 percent) of the 1,214 females mastered 4 or 5 objectives. One thousand and eighteen (84.0 percent) of the 1,212 males mastered the highest category of objectives. The patterns of percentages in the categories of objectives mastered were different for the two sex types. Females had a higher percentage of their student population in the high category of objectives mastered. There was a significant difference in the pattern of percentages for the two sex types, with females having a higher percentage of students in the high mastery group, and males having a higher percentage

Table 23

Crosstabulation Analysis: WORDID by Sex

Sex	Number of Objectives Mastered 0-1 Low	2-3 Middle	4-5 High	Row Totals
Female	59 4.9%	80 6.6%	1,075 88.6%	1,214
Male	70 5.8%	124 10.2%	1,018 84.0%	1,212
Column Totals	129	204	2,093	2,426
Chi square = 11.979		df = 2		p = 0.0025

of students in the low mastery group. The chi square of 11.979 with 2 degrees of freedom was significant at p = .0025. This was statistically significant at the .01 alpha level.

Summary

This study found a statistically significant relationship between class size and reading readiness achievement in kindergarten students in relation to the twenty-five total Basic Skills reading readiness objectives (MASTERY) and the subcategory of twenty Basic Skills comprehension objectives (READCOMP). The study did not find a significant relationship between class size and the subcategory of five Basic Skills word identification skills (WORDID). This possibly can be explained by the fact that the five WORDID items are some

of the first reading readiness skills which the student masters. They are often taught by parents before students enter school.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The results in this study were based on a sample of 2,837 kindergarten students. The sample of the study was determined by Basic Skills First reading readiness records submitted by Tennessee kindergarten teachers involved in the first year of Project STAR (Student Teacher Academic Ratio). Project STAR is a four-year $12 million longitudinal study of class size conducted by the Tennessee State Department of Education and funded by the Tennessee General Assembly. Class sizes for Project STAR were: 1:15, 1:25, and 1:25 plus a full-time aide. The data for this study were gathered in the school year 1985-86.

The instruments employed to assess kindergarten reading readiness were the individual or group profiles on kindergarten students involved in Project STAR. The profiles were recorded to indicate mastery or non-mastery on skills tested. There were 25 tested Basic Skills reading readiness objectives. The 25 reading readiness objectives included subcategories of 20 reading comprehension objectives and 5 word identification skills objectives. Demographic data

collected for students included sex, race, socioeconomic status, geographic locality, and attendance.

Five-way analysis of variance procedures and a cross-tabulation procedure with a chi-square test of significance were applied to the data to determine if any relationships existed between class size and reading readiness achievement, and between each of the variables.

Findings

The hypothesis stated that there would be no difference in the outcome measures across the various conditions of the study.

The findings for the conditions of the study were the following:

1. The study found a statistically significant relationship between small class size and reading readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategory of the 20 comprehension objectives. The null hypothesis was rejected at the .01 level of significance. The study found no significant relationship between small class size and reading readiness achievement in the subcategory of the five word identification skills. The null hypothesis was not rejected at the .05 level of significance.

2. The study found a statistically significant relationship between the two sex types (male, female) and reading

readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategories of the 20 comprehension objectives and the 5 word identification objectives. The null hypothesis was rejected at the .01 level of significance.

3. The study found a statistically significant relationship between the three race types (white, black, other) and reading readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategories of the comprehension objectives and the word identification objectives. The null hypothesis was rejected at the .05 level of significance. However, it must be noted that the high chi square in this analysis may be inflated because two out of nine of the cells had expected frequencies less than five. The critical value for chi square with four degrees of freedom is 9.49. Since the calculated value of chi square is 136.77, the fact that it is inflated by having low expected frequencies does not alter the judgment that there is a significant relationship among the three race types relative to number of objectives mastered.

4. The study found a statistically significant relationship between the four geographic localities (inner city, suburban, rural, urban) and reading readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategories of the 20

comprehension objectives and the 5 word identification objectives. The null hypothesis was rejected at the .01 level of significance.

5. The study found a statistically significant relationship between the two socioeconomic categories (free/reduced lunch, non-free lunch) and reading readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategories of the 20 comprehension objectives and the 5 word identification objectives. The null hypothesis was rejected at the .01 level of significance.

6. The study found a statistically significant relationship between the four attendance categories (0-88 percent present, 89-93 percent present, 94-97 percent present, and 98-100 percent present) and reading readiness achievement of kindergarten students in relation to the 25 Basic Skills reading readiness objectives and the subcategory of the 20 comprehension objectives. The null hypothesis was rejected at the .01 level of significance. The study found a statistically significant relationship between attendance and the subcategory of the 5 word identification skills. The null hypothesis was rejected at the .05 level of significance.

7. Class type was found to have a significant interaction with geographic localities in the mastery of reading readiness achievement for the 25 total Basic Skills and the

two subcategories of the 20 reading readiness comprehension objectives and the 5 word identification objectives. Small class size made a greater difference in the inner city and the smallest difference was found in the rural areas. The null hypothesis was rejected at the .01 level of significance.

8. Class type was found to have a significant interaction with the two sex types in the mastery reading readiness achievement for the composite of the 25 Basic Skills and the subcategory of the 5 word identification objectives. Males had the lowest achievement record in the regular class. The highest achievement for males was in the small class. The null hypothesis was rejected at the .01 level of significance.

9. Class type was found to have a significant interaction with socioeconomic status and the mastery of the reading readiness achievement for the word identification subcategory. The lowest mean score for free/reduced lunch students was in the regular class. Free/reduced lunch students recorded identical scores in the small and regular class plus a full-time aide. Class size did not effect non-free lunch students' performance on the WORDID category.

10. Small classes had the greatest percentage of students who mastered the highest category (23-25) of the objectives for the reading readiness areas of the 25 Basic Skills and the subcategory of reading comprehension. The null hypothesis was rejected at the .01 level of significance.

11. The study found no significant relationship between the percentage of students in any class size who mastered the highest category of objectives in the WORDID category. The null hypothesis was not rejected at the .05 level of significance.

12. A higher percentage of white students mastered the highest category of objectives in MASTERY, READCOMP, and WORDID. The null hypothesis was rejected at the .01 level of significance.

Conclusions

Some of the conclusions that may be drawn about the significant effect of class size on kindergarten reading readiness achievement are:

1. Students in small classes (1:15) obtained significantly higher mean scores on the composite of the 25 reading readiness objectives and on the subcategory of the 20 comprehension objectives. Students in small classes did not obtain significantly higher mean scores on the 5 word identification objectives.

This study found that small class size is a statistically significant factor in kindergarten reading readiness achievement. However, small class size did not show a significant effect on the mastery of the five word identification skills. This can possibly be explained by the skills identified in the word identification objectives. These included: identify

name; identify first and last names; match word with word cards; selecting matching letters or words; name capital and lower case letters. If any reading readiness objectives are taught before students enter kindergarten, these are probably the skills the student will have mastered. Also, since these are lower level thinking skills, large group instruction rather than small group or individualized instruction can probably produce mastery of these skills, which can be taught in a 1:25 ratio classroom as well as in a 1:15 ratio classroom. However, since the word identification skills are only a very small portion of the reading readiness skills necessary for a student to begin formal reading, the size of the class becomes an important factor. Students in smaller classes have a greater opportunity for success in school.

It must also be noted that the small class obtained a higher mean score than the regular class plus a full-time aide. Even though having a full-time aide provided some achievement gains, the gains were not as great as in the small class. A school system should get a greater return for its investment if it reduces class size instead of hiring full-time aides.

2. Females obtained a higher mean score than males in this study. This can probably be explained by a higher maturity level of females at this age. The lowest mean scores were obtained by males in the regular classroom (1:25). This

study indicates that a regular classroom is the most detrimental class size to kindergarten males in relation to reading readiness achievement.

3. Non-free lunch students obtained a higher mean score than free/reduced lunch students in this study. One of the greatest differences in mean scores was found between the two socioeconomic categories. The lowest mean scores were recorded for free/reduced lunch students in the regular classroom, while the highest mean score for free/reduced lunch students was recorded in the small class. From this study, it can be concluded that free/reduced lunch students have been identified as one of the greatest at-risk groups and need more teacher time in kindergarten for reteaching and reinforcing skills. It can also be concluded that a school system would receive one of the greatest returns for its investment when free/reduced lunch students are in classes with a 1:15 ratio so the teacher can provide more individual and small group instruction.

4. Inner city students obtained the lowest mean scores of the four geographic localities, and their lowest score was in the regular classroom setting. The highest mean score for inner city students was obtained in the small class. This indicates that small class size is one of the most essential elements needed by inner city students for mastery of reading readiness objectives.

5. Students in the lowest attendance category obtained the lowest mean score in each of the three class types. Small class size did not prove beneficial when student attendance was in the lowest category. However, the highest mean score was recorded for students in the 94-97 percent of days present category in the small class. It can be concluded from this study, that very low attendance is so detrimental to student achievement that small class size cannot provide the reinforcement time necessary for mastery of reading readiness skills. Small class size provides benefits in reading readiness achievement when students are present. The academic benefits which come from high attendance can be achieved when teachers of small classes establish closer contact with the homes and help insure high attendance.

At this time, Tennessee is in the forefront of class size research. The $12 million appropriated by the General Assembly was a visionary approach toward educational improvement, but must be only the first step in providing the kind of education needed in the state. This study identified certain variables that even at the kindergarten level provide a basis for identifying which children are at risk in the educational system. This research indicated that at the kindergarten level in reading readiness skills:

(a) Females achieve higher than males.

(b) White students achieve higher than black students and students of other races.

(c) Non-free lunch students achieve higher than free/reduced lunch students.

(d) Suburban and rural students achieve higher than inner city and urban students.

(e) Students who attend at least 90 percent of the time achieve higher.

(f) For each of these groups which are the lower achievers, the regular classroom (1:25) is the most detrimental to their mastery of the basic skills in reading readiness, and the small class is the most beneficial to these and all kindergarten students.

Recommendations

Based on the findings and conclusions of this study, the following recommendations were made:

1. The Tennessee General Assembly should mandate kindergarten attendance for all students.

2. The Tennessee General Assembly should lower the pupil/teacher ratio to 1:15 for kindergarten students to provide all students in Tennessee an appropriate basis for learning.

3. In-service and summer training sessions should be provided for kindergarten teachers with 1:15 ratio classrooms.

These sessions should include (a) appropriate instructional techniques for small group or individualized instruction, (b) training for teachers to provide a more in-depth understanding and knowledge of child development and appropriate activities to strengthen the developmental weaknesses for the students who were identified at risk in this study, (c) early childhood guidance training so that every kindergarten teacher would become a guidance counselor within the classroom to better meet the needs of kindergarten students.

4. When kindergarten teachers are responsible for fifteen students, a closer contact can be established with the student's home. This could include home visits in which the teacher could gain a better understanding of the child and his/her needs. Teachers could share with parents on a one-to-one basis activities to reinforce needed reading readiness skills. These visits could also hopefully strengthen the importance of better attendance in helping to strengthen the mastery of the basic skills in reading readiness.

5. Local boards of education should provide training sessions for parents of the type of students who were identified as at-risk students by this study. These sessions should include ways in which parents can work with children daily to teach and reinforce the reading readiness skills necessary before a student can begin formal reading.

Data from this study are somewhat unique in that they provide conclusions on variables which effect mastery of reading readiness skills by kindergarten students. Few research studies have addressed the importance of small class size on kindergarten reading readiness achievement. This study found that not only does small class size make a difference, but it identified groups of kindergarten students who are at-risk. The findings of this study are too important and vital to become another research project which only gathers dust on a shelf. The implications are so profound that the Tennessee General Assembly should address and act on the issues raised. Tennessee school board members, educators, and parents must take the findings and initiate political activities which will insure that small class size be provided for all kindergarten students. David Elkind pointed out (in the May 1986 Kappan) that parents, educators, administrators, and legislators are ignoring the facts, research, and consensus of experts about how young children learn and how best to teach them. In Tennessee, we have the opportunity to take the research findings of this study and create small classrooms in which teachers have the time to utilize appropriate instructional strategies to meet the needs of each kindergarten student in our schools.

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APPENDIX A

HOUSE BILL NO. 544

HOUSE BILL NO. 544

By Cobb

Substituted for: Senate Bill No. 799

By Lewis

AN ACT to amend Tennessee Code Annotated, Title 49, Chapter 3, relative to incentives for class size reductions.

BE IT ENACTED BY THE GENERAL ASSEMBLY OF THE STATE OF TENNESSEE:

SECTION 1. Tennessee Code Annotated, Title 49, Chapter 3, is amended by adding a new Part 4, as follows:

49-3-401. In order to study the effects of a reduced pupil-teacher ratio on the achievement of students in public school, there is hereby created a demonstration project in which demonstration centers are established in varied environments across Tennessee, to be staffed as set out in this part.

49-3-402. The demonstration centers shall be established and operated under guidelines recommended by the commissioner of education and approved by the state board of education. The guidelines shall include, but not be limited to, the following:

(1) Demonstration centers, to be operated by local boards of education, shall be established in inner city schools, in urban schools, in suburban schools, and in rural schools.

(2) Demonstration centers shall be established in the three grand divisions of the state of Tennessee.

(3) Every class in the teacher/pupil ratio demonstration project shall have a maximum enrollment of seventeen (17); if the enrollment should decrease below 13 through loss of students, additional pupils may be added at the beginning of each six weeks grading period to bring enrollment up to thirteen (13).

(4) Different models may be authorized to study and measure the relative effects of providing

planning time to teachers, staff development programs for teachers, the use of teacher aides, the use of teachers with various levels of training and experience and other concepts approved by the board.

49-3-403. Approximately two hundred (200) teaching positions, as determined by the commissioner of education, shall be utilized and funded in the demonstration centers. All costs for these teachers shall be borne by the state department of education, including the local salary supplement otherwise required by law to be paid from local funds, but not including fringe benefits to which other teachers in the local school system are entitled. Every teacher in a demonstration project under this part shall receive the same compensation, given his training, experience, and certification, as he would otherwise receive as a regular teacher, in the local school system. No demonstration teacher shall receive less instructional support and supplies than teachers not in demonstration projects at the same grade level in the same school system. The local education agencies participating in the demonstration projects shall provide classroom space for the projects.

49-3-404. Five percent (5%) of the total appropriation for the demonstration project shall be allocated to the department of education for administrative costs. The commissioner of education may allocate to every local school system participating in this demonstration project an amount not exceeding five percent (5%) of the cost of the center for such system for administrative costs incurred in operating the center.

49-3-405. The purpose of the demonstration project created by this part is to make a longitudinal study of the relative effects of reduced pupil-teacher ratio on the achievement of pupils in accordance with the goals set by the general assembly in Section 49-5-5023. To this end all demonstration centers for the 1985-1986 school year shall be for kindergarten pupils. In the 1986-1987 school year, the demonstration centers shall be for these same pupils in the first grade; in 1987-1988 for these same pupils in the second grade, and in 1988-1989 for these same pupils in the third grade. The guidelines authorized by 49-3-402 may include provisions for the addition of pupils to demonstration classes so that a teacher/pupil ratio as specified by this act may be maintained during the second and third years of the

demonstration project. The study authorized herein may include the identification of a control group of pupils in the same school system for purposes of measuring differences in achievement and development of pupils in the demonstration center classes. The state department of education shall submit a plan for evaluating achievement of students to the state board of education for its approval and will implement the evaluation program in accordance with the adopted plan. The evaluation plan shall encompass the goals established by the general assembly in Section 49-5-5023. The state board of education shall submit to the general assembly annual reports of each project year and a final report of the results of the demonstration project.

49-3-406. Local school officials and employees shall assist the commissioner and state board of education in the study and reports provided in 49-3-405.

49-3-407. The teachers in the teacher/pupil ratio demonstration projects shall receive inservice training regarding effective ways to instruct students in small classes. The state department of education shall submit a teacher training plan to the state board of education for its approval and will implement the teacher training program in accordance with the adopted plan.

SECTION 2. This Act shall be implemented to the extent provided by funds annually appropriated for fiscal year 1985-1986, 1986-1987, 1987-1988, and 1988-1989.

SECTION 3. This Act shall be implemented within the limits and provisions set out in the general appropriations Act.

SECTION 4. This Act shall take effect July 1, 1985, except that for purposes of developing guidelines it shall take effect on becoming law, the public welfare requiring it.

APPENDIX B

TESTED BASIC SKILLS INDIVIDUAL STUDENT RECORD

TESTED BASIC SKILLS GROUP RECORD

TENNESSEE BASIC SKILLS FIRST
State Department of Education

Reading Skills Mastery Test Record

STRANDS: 1 - Comprehension Skills
2 - Word Identification Skills
3 - Reference and Study Skills

Name _____
School _____
System _____
Teacher _____
Grade _____ Year 19 - 19
Year 19 - 19
(if repeating)

KINNERGARTEN/READINESS LEVEL	CODE ☒ Mastered Test
02147: 0 = Grade Level 2 = Reading 1 = Strand 47 = Skill Number	▨ Less than 80% on test

COMPREHENSION SKILLS			DATE		DATE
give personal data	02101				
name parts of body	02102				
name/associate five senses	02103				
identify colors	02104				
identify four basic shapes	02105				
use propositions/position wds.	02108				
name similar objects	02109				
name parts/uses of objects	02110				
speak in complete sentences	02111				
describe contents of picture	02115				
retell a story in order	02116				
repeat a selection from memory K	02118				
repeat a selection from memory R	02118				
match word with picture	02123				
arrange 3-4 pictures in order	02126				
match pictures/story sequence	02129				
draw and color/main idea	02134				
predict ending	02137				
make up an ending	02139				
answer factual questions	02144				
select/exp. pic. for story	02146				
WORD IDENTIFICATION SKILLS					
identify name	02201				
identify first and last names	02202				
match words with word cards	02209				
sel. matching letters or words	02210				
name capital, lower case ltrs.	02217				
REFERENCE AND STUDY SKILLS					
(none)					

READING SKILLS GROUP RECORD

Comprehension Skills
Kindergarten/Readiness

Basal_____

Names	*02101 give personal data	*02102 name parts of body	*02103 name/associate five senses	*02104 identify colors	*02105 identify four basic shapes	02106 name common objects	02107 use quantitative words	*02108 use prepositions/position wds.	*02109 name similar objects	*02110 name parts/uses of objects	*02111 speak in complete sentences	02112 express personal feelings/needs	02113 use adjectives to describe object	02114 relate experience to selection	*02115 describe contents of picture	*02116 retell a story in order	02117 listen to literary selection	*02118 repeat selections from memory K	*02118 repeat selections from memory R	02119 rec. repetition, rhythm, etc.	02120 words omitted at end of sent.	02121 rec. printed wds. for class objs.	02122 match word at first or middle	*02123 recall order with picture	02124 recall order of events	02125 recall imp. events from story	*02126 arrange 3-4 pictures in order	02127 pantomime or dramatize events	02128 recall first and last of story

READING SKILLS GROUP RECORD

Comprehension Skills (cont.)
Kindergarten/Readiness

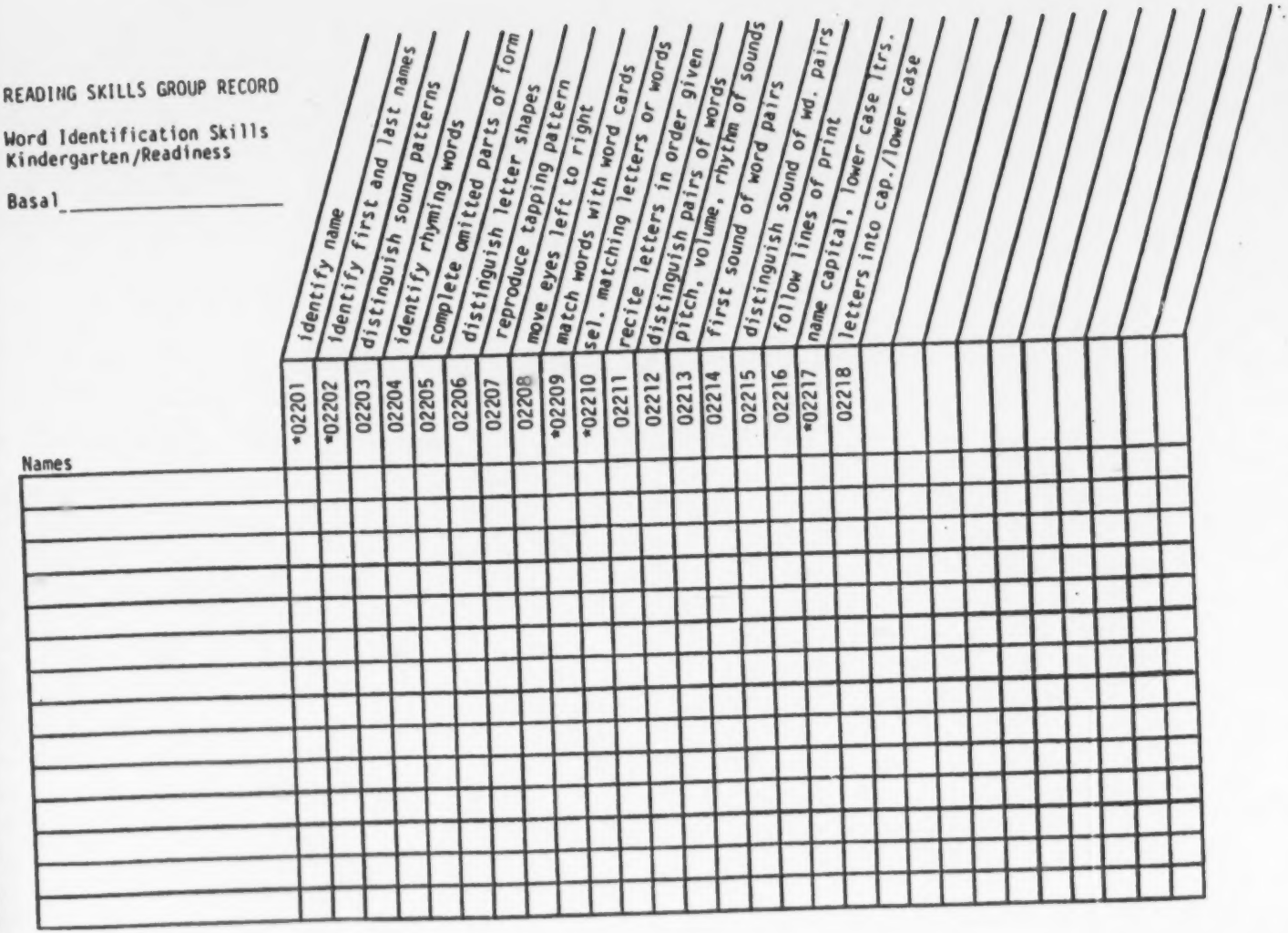
Basal_____

Names	*02129 match pictures/story sequence	02130 recall events from story	02131 classify objects, pictures	02132 recognize important title	02133 tell story, pick title w/help	*02134 draw and color/main idea	02135 tell story, choose title	02136 predict repetition	*02137 predict ending	02138 predict next event	*02139 make up an ending	02140 pantomime or dramatize character	02141 describe favorite characters	02142 react as character would	02143 draw conclusions about exp.	*02144 answer factual questions	02145 draw conclusions about char.	*02146 select/exp. pic. for story	02147 identify causes of outcome	02148 recognize cause/effect										

READING SKILLS GROUP RECORD

Word Identification Skills
Kindergarten/Readiness

Basal_____


Names
*02201 identify name
*02202 identify first and last names
02203 distinguish sound patterns
02204 identify rhyming words
02205 complete omitted parts of form
02206 distinguish letter shapes
02207 reproduce tapping pattern
02208 move eyes left to right
*02209 match words with word cards
*02210 sel. matching letters or words
02211 recite letters in order given
02212 distinguish pairs of words
02213 pitch, volume, rhythm of sounds
02214 first sound of word pairs
02215 distinguish sound of wd. pairs
02216 follow lines of print
*02217 name capital, lower case ltrs.
02218 letters into cap./lower case

READING SKILLS GROUP RECORD

Reference and Study Skills
Kindergarten/Readiness

Basal_____

| Names | 02301 use library materials properly | 02302 locate and use books | 02303 select books for class | 02304 recog. title, author, illus. | 02305 purpose of calendar | 02306 follow one-step directions | 02307 follow two-step directions | | |

APPENDIX C

ITEM BY ITEM ANALYSIS OF THE TWENTY-FIVE TESTED TENNESSEE READING READINESS OBJECTIVES

Table 24

Give Personal Data

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	141 19.4%	584 80.6%	725
Regular	258 24.0%	816 76.0%	1,074
Regular + FTA	233 23.3%	767 76.7%	1,000
Column Total	632	2,167	2,799
Chi square = 5.64224	df = 2		p = .0595

Table 25

Name Body Parts

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	25 3.4%	700 96.6%	725
Regular	63 5.9%	1,011 94.1%	1,074
Regular + FTA	64 6.4%	936 93.6%	1,000
Column Total	152	2,647	2,799
Chi Square = 7.77363	df = 2		p = .0205

Table 26

Name/Associate Five Senses

Variable	Non-Mastery	Mastery	Row Total
Class Type			
Small	53 7.3%	672 92.7%	725
Regular	100 9.3%	974 90.7%	1,074
Regular + FTA	114 11.4%	886 86.6%	1,000
Column Total	267	2,532	2,799
Chi square = 8.25127	df = 2		p = .0162

Table 27

Identify Colors

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	40 5.5%	685 94.5%	725
Regular	58 5.4%	1,016 94.6%	1,074
Regular + FTA	58 5.8%	942 94.2%	1,000
Column Total	156	2,643	2,799
Chi square = 0.16301	df = 2		p = .9217

Table 28

Identify Four Basic Shapes

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	43 5.9%	682 94.1%	725
Regular	98 9.1%	976 90.9%	1,074
Regular + FTA	87 8.7%	913 91.3%	1,000
Column Total	228	2,571	2,799
Chi square = 6.53909	df = 2		p = .0380

Table 29

Use Preposition/Position Words

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	72 9.9%	653 90.1%	725
Regular	194 18.1%	880 81.9%	1,074
Regular + FTA	130 13.0%	870 87.0%	1,000
Column Total	396	2,403	2,799
Chi square = 25.25426	df = 2		p = .0000

Table 30

Name Similar Objects

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	63 8.7%	662 91.3%	725
Regular	129 12.0%	945 88.0%	1,074
Regular + FTA	102 10.2%	898 89.8%	1,000
Column Total	294	2,505	2,799
Chi square = 5.3237	df = 2		p = .0731

Table 31

Name Parts/Uses of Objects

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	141 19.4%	584 80.6%	725
Regular	263 24.5%	811 75.5%	1,074
Regular + FTA	246 24.6%	754 75.4%	1,000
Column Total	650	2,149	2,799
Chi square = 7.82104	df = 2		p = .0200

Table 32

Speak in Complete Sentences

Variables	Non-Mastery	Mastery	Row Total
Class Type:			
Small	50 6.9%	675 93.1%	725
Regular	175 16.3%	899 83.7%	1,074
Regular + FTA	123 12.3%	877 87.7%	1,000
Column Total	348	2,451	2,799
Chi square 35.13564	df = 2		p = .0000

Table 33

Describe Contents of Pictures

Variables	Non-Mastery	Mastery	Row Total
Class Type:			
Small	75 10.3%	650 89.7%	725
Regular	141 13.1%	933 86.9%	1,074
Regular + FTA	129 12.9%	871 87.1%	1,000
Column Total	345	2,454	2,799
Chi square = 3.57818	df = 2		p = .1671

Table 34

Retell a Story in Order

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	79 10.9%	646 89.1%	725
Regular	185 17.2%	889 82.8%	1,074
Regular + FTA	149 14.9%	851 85.1%	1,000
Column Total	413	2,386	2,799
Chi square = 13.80865	df = 2		p = .0010

Table 35

Repeat Sections from Memory

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	81 11.2%	644 88.8%	725
Regular	212 19.7%	862 80.3%	1,074
Regular + FTA	169 16.9%	831 83.1%	1,000
Column Total	462	2,337	2,799
Chi square = 23.22484	df = 2		p = .0000

Table 36

Match Word With Picture

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	99 13.7%	626 86.3%	725
Regular	242 22.5%	832 77.5%	1,074
Regular + FTA	206 20.6%	794 79.4%	1,000
Column Total	547	2,252	2,799
Chi square = 22.79990	df = 2		p = .0000

Table 37

Arrange Three to Four Pictures in Order

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	93 12.8%	632 87.2%	725
Regular	181 16.9%	893 83.1%	1,074
Regular + FTA	204 20.4%	796 79.6%	1,000
Column Total	478	2,321	2,799
Chi square = 17.08056	df = 2		p = .0002

Table 38

Match Picture/Story Sequence

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	147 20.3%	578 79.7%	725
Regular	252 23.5%	822 76.5%	1,074
Regular + FTA	215 21.5%	785 78.5%	1,000
Column Total	614	2,185	2,799
Chi square = 2.74158	df = 2		p = .2539

Table 39

Draw and Color Main Idea

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	127 17.5%	598 82.5%	725
Regular	265 24.7%	809 75.3%	1,074
Regular + FTA	210 21.0%	790 79.0%	1,000
Column Total	602	2,197	2,799
Chi square = 13.36973	df = 2		p = .0012

Table 40

Predict Ending

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	118 16.3%	607 83.7%	725
Regular	201 18.7%	873 81.3%	1,074
Regular + FTA	186 18.6%	814 81.4%	1,000
Column Total	505	2,294	2,799
Chi square = 2.06897	df = 2		p = .3554

Table 41

Make Up An Ending

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	131 18.1%	594 81.9%	725
Regular	288 26.8%	786 73.2%	1,074
Regular + FTA	254 25.4%	746 74.6%	1,000
Column Total	673	2,126	2,799
Chi square = 19.69688	df = 2		p = .0001

Table 42

Answer Factual Questions

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	117 16.1%	608 83.9%	725
Regular	251 23.4%	823 76.6%	1,074
Regular + FTA	188 18.8%	812 81.2%	1,000
Column Total	556	2,243	2,799
Chi square = 15.33054	df = 2		p = .0005

Table 43

Select/Explain Picture for Study

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	132 18.2%	593 81.8%	725
Regular	281 26.2%	793 73.8%	1,074
Regular + FTA	236 23.6%	764 76.4%	1,000
Column Total	649	2,150	2,799
Chi square = 15.53526	df = 2		p = .0004

Table 44

Identify Name

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	50 6.9%	675 93.1%	725
Regular	80 7.4%	994 92.6%	1,074
Regular + FTA	60 6.0%	940 94.0%	1,000
Column Total	190	2,609	2,799
Chi square = 1.73602	df = 2		p = .4198

Table 45

Identify First and Last Names

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	60 8.3%	665 91.7%	725
Regular	105 9.8%	969 90.2%	1,074
Regular + FTA	89 8.9%	911 91.1%	1,000
Column Total	254	2,545	2,799
Chi square = 1.23885	df = 2		p = .5383

Table 46

Match Word with Word Card

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	113 15.6%	612 84.4%	725
Regular	152 14.2%	922 85.8%	1,074
Regular + FTA	188 18.8%	812 81.2%	1,000
Column Total	453	2,346	2,799
Chi square = 8.50279	df = 2		p = .0142

Table 47

Select Matching Letters or Words

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	97 13.4%	628 86.6%	725
Regular	166 15.5%	908 84.5%	1,074
Regular + FTA	181 18.1%	819 81.9%	1,000
Column Total	444	2,355	2,799
Chi square = 7.23349	df = 2		p = .0269

Table 48

Name Capital and Lower Case Letters

Variable	Non-Mastery	Mastery	Row Total
Class Type:			
Small	161 22.2%	564 77.8%	725
Regular	287 26.7%	787 73.3%	1,074
Regular + FTA	236 23.6%	764 76.4%	1,000
Column Total	684	2,115	2,799
Chi square = 5.37027	df = 2		p = .0682